0055470

Date:

15 March 2001

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project: ERDF Leachate Delisting Analysis

Subject: Semivolatiles - Data Package No. H1173-LVI (SDG No. H1

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-LVI prepared by Lionville Laboratory Incorporated (LVI). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	С	See note 1 & 2
B110B3	12/4/00	Water	С	See note 1 & 2
B110B3R	12/4/00	Water	С	A re-analysis of sample B110B3 outside holding time.

^{1 -} Semivolatiles by EPA 8270C (add-ons 0,0,0-Triethylphosphorothioate; 1,4-dinitrobenzene, 1-acetyl-2-thiourea, 2,5-diaminotoluene and cyclohexyl-4,6-dinitrophenol were requested and a spectral search was conducted for all).

2 - PAHs by 8310.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the extraction holding time being exceeded by greater than four times the limit, all detected semi-volatile results in sample B110B3R were rejected and flagged "R" and all non-detected results were qualified as estimates and flagged "J".

Due to the holding time being exceeded by less than twice the limit, all PAH results were qualified as estimates and flagged "J".

All other holding times were met.

Method Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

See surrogate recovery section.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

Accuracy

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within a range of 50-150% or within laboratory control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to the lack of a matrix spike/matrix spike duplicate analysis, all PAH results were qualified as estimates and flagged "J".

See the surrogate recovery section below.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the contract required quantitation limit (CRQL) are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

Due to surrogate recoveries below 10% in sample B110B2 and the matrix spike associated with samples B110B2 and B110B3, combined with matrix spike recoveries below 10% for all spiked compounds, all semi-volatile results in samples B110B2 and B110B3 were rejected and flagged "R".

Due to the combination of greatly exceeded holding times, low sample and QC sample (matrix spike and method blank) surrogate recoveries and matrix spike percent recoveries, all semi-volatile results in sample B110B3R were rejected and flagged "R".

Due to surrogate recoveries outside QC limits, all PAH results were qualified as estimates and flagged "J".

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike (MS)/matrix spike duplicate (MSD) results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Samples results must be within RPD limits of +/-20%. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

Semi-volatile matrix spike/matrix spike duplicate RPDs were not calculated due to the rejection of all semi-volatile data and the lack of a matrix spike/matrix spike duplicate for PAH.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to LVI for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for semi-volatile duplicate results was not calculated due to rejection of all semi-volatile data. All PAH field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the project quantitation levels (PQLs) to ensure that laboratory detection levels meet the required criteria. Fifty-two (52) semi-volatile analytes had detection levels above the PQL (see pages 11-15) as well as the PAHs dibenzo(a,h)anthracene, benzo(a)pyrene, chrysene, benzo(k)fluoranthrene, benzo(a)anthracene and indeno(1,2,3-cd)pyrene. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

Completeness

Data package No. H1173-LVI (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 9%.

MAJOR DEFICIENCIES

Due to surrogate recoveries below 10% in sample B110B2 and the matrix spike associated with samples B110B2 and B110B3, combined with matrix spike recoveries below 10% for all spiked compounds, all semi-volatile results in samples B110B2 and B110B3 were rejected and flagged "R". Due to the combination of greatly exceeded holding times, low sample and QC sample (matrix spike and method blank) surrogate recoveries and matrix spike percent recoveries, all semi-volatile results in sample B110B3R were rejected and flagged "R". Rejected data is unusable and should not be reported.

MINOR DEFICIENCIES

Due to the extraction holding time being exceeded by greater than four times the limit, all non-detected results were qualified as estimates and flagged "J". Due to the holding time being exceeded by less than twice the limit, all PAH results were qualified as estimates and flagged "J". Due to surrogate recoveries outside QC limits, all PAH results were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Fifty-two (52) semi-volatile analytes had detection levels above the PQL/CRQL (see pages 11-15) as well as the PAHs dibenzo(a,h)anthracene, benzo(a)pyrene, chrysene, benzo(k)fluoranthrene, benzo(a)anthracene and indeno(1,2,3-cd)pyrene. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

L			
SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Semivolatiles	R	All	Low surrogate recoveries, matrix spike recoveries
Semivolatiles	υJ	B110B3R	Holding time
PAH .	J	All	Holding times, no MS/MSD analysis, surrogate recoveries

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD				7											
Laboratory: RECRA LabNet			•	1											
	SDG: H	1172		-											
Case:	SDG: H	B110B2		B110B3		B110B3		T	-	T					
Sample Number		BIIUBZ								ļ					
Remarks				Duplicate		Re-analysis		ļ							
Sample Date		12/4/00		12/4/00		12/4/00				ļ					······································
Extraction Date	~~~~	12/8/00		12/8/00		1/3/01									
Analysis Date		12/26/00		12/26/00	,	1/22/01			т.	<u> </u>		-		<u> </u>	
Semivolatile (8270C)	CRQL	Result	Q	Result			Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol*	0.42		UR		UR		UR	ļ	_	<u> </u>		<u> </u>			
bis(2-Chloroethyl)ether*	1.5		UR		UR		UR			<u> </u>		<u> </u>			
2-Chlorophenol*	1.2		UR		UR		UR						<u>.</u>		
1,3-Dichlorobenzene*	1.3	l	UR		UR		UR								
1,4-Dichlorobenzene*	5	10	UR		UR		UR						_		T
Benzyl Alcohol			UR		UR		UR								
1,2-Dichlorobenzene*	1.2		UR		UR		UR								
2-Methylphenol		10	UR	10	UR	10	UR								
bis(2-Chloroisopropyl)ether*	2	10	UR	10	UR		UR								
4-Methylphenol		10	UR	10	UR	10	UR								1
N-Nitroso-di-n-propylamine*	1.8	10	UR	10	ŲR	10	UR						T		T
Hexachloroethane*	0.98	10	UR	. 10	UR	10	UR				1				
Nitrobenzene*	1.2	10	UR	10	UR	10	UR								
Isophorone*	1.4	10	UR	10	UR	10	UR								
2-Nitrophenol	10	10	UR	10	UR	10	UR		1						1
2,4-Dimethylphenol*	0.79	10	UR	10	UR	10	UR		1						
Benzoic acid		26	UR	26	UR	26	UR						1		1
bis(2-Chloroethoxy)methane*	1.6	10	UR	10	UR	10	UR				1		1		
2,4-Dichlorophenol*	1.2	10	UR	10	UR	10	UR				1				
1,2,4-Trichlorobenzene*	1.1	10	UR	10	UR	10	UR						" "		
Naphthalene*	0.3	10	UR	10	UR	10	UR								1
4-Chloroaniline	10	10	UR	10	UR	10	UR						1		
Hexachlorobutadiene*	0.89	10	UR	10	UR	10	UR						1		1
4-Chloro-3-methylphenol*	1.1	10	UR	10	UR	10	UR						1		1
2-Methylnaphthalene	10		UR	10	UR	10	UR		1				1		1
Hexachlorocyclopentadiene	10		UR		UR	10	UR		1		1		1		
2,4,6-Trichlorophenoi*	1.2		UR	10	UR	10	UR	İ	\top		1		†	-	1
2,4,5-Trichlorophenol*	0.76		UR		UR		UR	İ	1		1	1	1	1	1
2-Chloronaphthalene*	1.4		UR		UR			l	1-	1	1		1	 	1
2-Chioronaphtrialene	25		UR		UR		UR		1	 	1	 	 	 	+
Dimethylphthalate*	1.3	1	UR		UR		UR		+		+	 	-	 	+-
	1.3		UR		UR		UR		1.	 	+	 	+	 	+-
Acenaphthylene 2,6-Dinitrotoluene	10		UR		UR		UR	 	+	 	1-	 	+	1 -	+
と,o-Dinitrotoluene	1 10	10	1011	1	171,	1	121,	<u> </u>				.L		<u> 1</u>	

^{* -} The reported detection limit is above the PQL/CRQL

Project: BECHTEL-HANFORD]											
Laboratory: RECRA LabNet															
Case:	SDG: H	1173													
Sample Number		B110B2		B110B3		B110B3								l	
Remarks				Duplicate		Re-analysis									
Sample Date	•	12/4/00		12/4/00		12/4/00						<u> </u>			
Extraction Date		12/8/00		12/8/00		1/3/01									
Analysis Date		12/26/00		12/26/00		1/22/01				<u> </u>		<u> </u>			
Semivolatile (8270C)	CRQL	Result	Q	Result	Q	1	Q	Result	Q	Result	Q	Result	Q	Result	Q
3-Nitroaniline	25		UR		UR.		UR								
Acenaphthene*	0.5		UR		UR		UR				<u> </u>				\perp
2,4-Dinitrophenol*	2.3		UR				_			ļ					\bot
4-Nitrophenol*	2.1		UR		UR			ļ	ļ	ļ				<u> </u>	
Dibenzofuran	10		UR		UR			ļ		<u> </u>	<u> </u>	<u> </u>			
2,4-Dinitrotoluene	10		UR		UR					<u> </u>	 	<u> </u>	<u> </u>	<u> </u>	1
Diethylphthalate*	1.6		UR		UR		UR	<u> </u>		ļ	 		<u> </u>	ļ	\perp
4-Chlorophenyl-phenyl ether	10		UR		UR		UR		ļ	ļ <u>.</u>			1		1
Fluorene*	0.3		UR		UR			ļ		<u> </u>		<u> </u>	<u> </u>		
4-Nitroaniline	25		UR		UR		UR		ļ		 	↓	┦	ļ	4
4,6-Dinitro-2-methylphenol	25		UR		UR			ļ	<u> </u>	ļ				<u> </u>	1
N-Nitrosodiphenylamine*	1.5		UR		UR	·	UR			ļ			ļ	ļ	
4-Bromophenyl-phenyl ether*	1.9		UR		UR					ļ	1			ļ. <u>. </u>	4
Hexachlorobenzene	10		UR		UR		UR		ļ		ļ				\perp
Pentachlorophenol*	16		UR		UR		UR			<u>'</u>	1	ļ	↓	ļ	
Phenanthrene	10		UR		UR	1			<u> </u>	ļ			1	ļ	1
Anthracene *	0.5		UR		UR						 	ļ			4
Di-n-butylphthalate	1.6		UR		UR		UR		ļ	ļ	-	ļ			4-4
Fluoranthene*	0.3		UR		UR		UR	ļ			 	ļ	4	ļ	
Pyrene*	0.3		UR		UR		UR		<u> </u>	ļ	_	ļ	1		
Butylbenzylphthalate*	2.2		UR		UR		UR		ļ	ļ			_		\perp
3,3'-Dichlorobenzidine	10		UR		UR		UR		 	ļ	_		4		4
Benzo(a)anthracene*	0.1		UR		UR		UR		ļ	ļ	-		 	ļ	1
Chrysene*	0.1		UR		UR		UR			ļ	 	ļ	1	ļ	
bis(2-Ethylhexyl)phthalate*	2.9		UR		UR		R	ļ		<u> </u>	-		ļ		4
Di-n-octylphthalate*	1.8		UR		UR		UR		<u> </u>	ļ		-		ļ	4
Benzo(b)fluoranthene*	0.06		UR							ļ	┼	 	-	 	4
Benzo(k)fluoranthene*	0.2		UR		UR		UR	<u></u>	ļ	 	-			ļ	4
Benzo(a)pyrene*	0.05		UR	I	UR		UR	ļ		ļ	1	ļ	1_		4
Indeno(1,2,3-cd)pyrene*	0.1		UR		UR		UR			<u> </u>				ļ	
Dibenz(a,h)anthracene*	0.05		UR		UR		UR			ļ		<u> </u>	-	ļ	
Benzo(g,h,i)perylene	10	J 10	UR	10	UR	10	UR	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u></u>	

^{* -} The reported detection limit is above the PQL/CRQL

Project: BECHTEL-HANFORD]										•	
Laboratory: RECRA LabNet															•
Case: SI	DG: H										•				
Sample Number		B110B2		B110B3		B110B3									
Remarks				Duplicate		Re-analysis				<u> </u>					
Sample Date		12/4/00		12/4/00		12/4/00				<u> </u>					
Extraction Date		12/8/00		12/8/00		1/3/01									
Analysis Date		12/26/00		12/26/00		1/22/01				ļ					
Semivolatile (8270C) CI		Result	a		Q	Result	Q_	Result	Q	Result	Q	Result	O.	Result	Q
1,4-Dioxane	10		UR	10			UR			<u> </u>	ļ				
Methyl methacrylate			UR	10			UR	<u> </u>	1	<u> </u>	ļ			ļ	
Pyridine*	0.96		UR	10			UR		<u> </u>	<u> </u>	<u> </u>			<u> </u>	
N-Nitrosodimethylamine*	1.3		UR	10			UR	<u> </u>	1	<u> </u>	<u> </u>			ļ	
Ethyl Methacrylate			UR	10			UR		 	ļ	ļ			<u> </u>	\bot
2-Picoline			UR	10			UR		 	<u> </u>	1	ļ			
N-Nitrosomethylethylamine			UR	10			UR		↓	ļ		ļ	4_		
Methyl methanesulfonate			UR	10			UR	<u> </u>	4		<u> </u>	ļ		-	
N-Nitrosodiethylamine			UR	10			UR			<u> </u>	<u> </u>	ļ		·	
Ethyl methanesulfonate*	3.3		UR	10			UR		<u> </u>	<u></u>	<u> </u>	<u> </u>			
Aniline*	2.7		UR	10			UR		1	 	1	ļ`		ļ	
Pentachloroethane			UR	10			UR		<u> </u>		.	<u> </u>			
3-Methylphenol			UR	10			UR		ļ	ļ	1	ļ		ļ	
N-Nitrosopyrrolidine			UR	10			UR			<u></u>	_				
Acetophenone*	3.4		UR	10			UR		 	ļ			-	↓	
N-Nitrosomorpholine	10		UR	10			UR		1-	ļ		 		<u> </u>	
O-Toluidine			UR	10			UR	ļ	┦	 				<u> </u>	
N-Nitrosopiperidine			UR	51			UR	 		ļ		ļ			
a,a-Dimethlyphenethylamine			UR	10			UR	<u> </u>	 	<u> </u>	 				
2,6-Dichlorophenol			UR	10			UR	ļ	 	ļ		 		<u> </u>	+-+
Hexachloropropene			UR	10			UR UR	<u> </u>	4		 	ļ		 	
p-Phenylenediamine	100		UR		UR UR		UR	 		 	-	 		 	
N-Nitroso-di-n-butylamine			UR	10			UR	 		 	+	 	+	 	
Safrole			UR		UR		UR	 	-		┼	 		- -	
1,2,4,5-Tetrachlorobenzene			UR				UR		+	 	+	 	-	 	
isosafrole			UR		UR UR		UR	 		 	-	 		 	
1,4-Napthaquinone	0.0		UR UR	10			UR	 		 	+	1	-	 	+-
1,3-Dinitrobenzene*	3.8		UR		UR		UR	*	+		+		+	+	+
Pentachlorobenzene			UR		UR		UR	 	+	 	+			 	+
1-Napthylamine					UR		UR		+	 	-			+	
2-Napthylamine *	4.4		UR		UR		UR	 	+	 		+	+-	+	
2,3,4,6-Tetrachlorophenol		10	UR	10	UK	T 10	lok	<u>.l</u>		L		1	ــــــــــــــــــــــــــــــــــــــ	_L	لــــــــــــــــــــــــــــــــــــــ

^{* -} The reported detection limit is above the PQL/CRQL

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Project: BECHTEL-HANFORD				-											
Laboratory: RECRA LabNet				4											
Case:	SDG: H							· · · · · · · · · · · · · · · · · · ·		T		,		,	
Sample Number		B110B2		B110B3		B110B3		ļ		ļ		ļ		ļ	
Remarks				Duplicate		Re-analysis				<u> </u>		<u> </u>		<u> </u>	
Sample Date		12/4/00		12/4/00		12/4/00				[<u> </u>		ļ	
Extraction Date	•	12/8/00		12/8/00		1/3/01			<u>.</u>	<u> </u>					
Analysis Date		12/28/00		12/26/00		1/22/01						ļ			
Semivolatile (8270C)	CRQL		Q	Result	Q		Q	Result	Q	Result	Q	Result	Q	Result	Q
1,3,5-Trinitrobenzene			UR		UR		UR	ļ		<u> </u>	<u> </u>				
Diallate			UR		UR		UR		<u> </u>						<u> L</u>
Phenacetin			UR		UR		UR			<u> </u>	<u> </u>				
Diphenylamine			UR		UR		UR	ļ	<u> </u>	<u> </u>	<u> </u>	<u> </u>			上
5-Nitro-o-toluidine			UR		UR		UR	<u> </u>				<u></u>			
4-Aminobiphenyl			UR		UR		UR						<u> </u>		L
Pronamide			UR		UR		UR								
2-sec-Butyl-4,6-dinitrophenol	" "		UR		UR		UR								
Pentachioronitrobenzene			UR		UR	L	UR				L				
4-Nitroquinoline-1-oxide		21	UR		UR		UR								L
Methapyrilene		10	UR		UR		UR]	
Aramite		21	UR		UR		UR]	
Chlorobenzilate		10	UR		UR		UR				L			<u> </u>	
p-Dimethylaminoazobenzene		10	UR		UR		UR								
3,3-Dimethylbenzidine		10	UR		UR		UR								
2-Acetylaminofluorene		10	UR	10	UR		UR								
7,12-Dimethylbenz(a)anthracene*	4.4	10	UR	10	UR		UR								
Hexachlorophene*	40	100	UR	100	UR	100	UR								
3-Methylcholanthrene		10	UR	10	UR		UR								
1,2-diphenylhydrazine		10	UR	10	UR	10	UR		L						
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^{* -} The reported detection limit is above the PQL/CRQL

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Project: BECHTEL-HANFORD]											
Laboratory: RECRA LabNet				1											
Case:	SDG: H	1173													
Sample Number		B110B2		B110B3											
Remarks				Duplicate		1									
Sample Date		12/4/00		12/4/00											
Extraction Date		12/8/00		12/8/00										<u> </u>	
Analysis Date	-	12/26/00		12/26/00		<u> </u>									
PAH (8310)	CRQL		Q		a	Result	a	Result	ΙQ	Result	Q	Result	Q	Result	Q
Benzo(a)anthracene*	0.1			0.13			1		1=		1=-		╁═─	1	1=-
	0.1	1.56		1.53			1	 	1	<u> </u>				 	1
Chrysene*A21	0.1			0.18			1			 		 	†	 	+-
Benzo(k)fluoranthrene*	0.05			0.17			+		+	·			T	1	+
Benzo(a)pyrene*	0.05			0.17		 	+		+	<u> </u>			1		+-
Dibenzo(a,h)anthracene*	0.05	0.24	111	0.23	111	 	+	 	+		 	 	1	 	1
Benzo(ghi)perylene	0.1	0.31		0.44		 	+-		 		 	 	+	 	+
Indeno(1,2,3-cd)pyrene*	0.1	0.44	03	0.44	03		+-		 		 	 	1	·	
				 	-		+-	-	 	 	 		+	 	+
				 				 	 	<u> </u>	-	 	 	 	
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^{* -} The reported detection limit is above the PQL/CRQL

Semivolatiles by GC/MS, Appendix IX List

Report Date: 01/25/01 09:44

FW Batch Number: 0012L502	Client: TNUHA	NFORD B99-037	Appendix IX I H1173 Work	Order: 10985 00 1	.001 Pa	ige: 1a
Cust ID:	B110B2	B110B2	B110B2	B110B3	B110B3	B110B3
ample RFW#:	002	002 MS WATER	002 MSD WATER	003 WATER	003 Water	003 MS Water
nformation Matrix:	WATER		1.00	1.00	1.00	1.00
D.F.: Units:	1.00 ug/L	1.00 ug/L	ug/L	ug/L	ug/L	ug/L
Onics.	ug/ 2	-3, -			REPREP	REPREP
Nitrobenzene-d5	3 * %	3 * %	18 * %	10 * %	3 * %	1 * *
1 1 1 1		4 * %	19 * %	11 * %	6 * *	2 * *
		7 * %	33 %	18 * %		3 * %
ecovery p-Terpheny1-d14 Phenol-d5	-	4 * %	17 %	10 %	3 * %	19 🕏
	_	3 * %	17 * 8	10 * %	13 * %	56 %
2-Fluorophenol	0 4 8.	2 * \$	13 %	8 * %	40 %	79 ક
2,4,6-Tribromophenol	fl==	f}	======fl==	:======f1==:	fl==:	f
	10 UR	4 * %	18 %	10 U R	10 U (K	\ 15 °8
heno1		20 U	22 U	10 ט ``	ן ט 10	· 10 U
is(2-Chloroethyl)ether		4 * %	18 * %	10 U	10 U	27 %
-Chlorophenol	- "] [20 U	22 U	ט 10	10 U \	1.C U
,3-Dichlorobenzene		3 * %	16 * %	10 U	10 U	1 * %
,4-Dichlorobenzene	- :: : \	20 U	22 U	10 U	10 U	10 U
enzyl alcohol		20 U	22 U	10 U	10 U	10 U
,2-Dichlorobenzene	-	20 U	22 U	10 U	10 U	10 ()
-Methylphenol	_	20 U	22 U	10 U	10 U	10 U
is(2-Chloroisopropyl)ether		20 U	22 U	10 U	10 U	10 U
-Methylphenol		4 * %	18 * %	10 U	10 U	0 * %
-Nitroso-Di-n-propylamine	– <u> </u>	20 U	22 U	10 U	10 U	10 U
exachloroethane		20 U	22 U	10 U	10 U	10 U
itrobenzene	10 U		22 Ü	10 U	10 U	10 U
sophorone			22 U	10 U	, 10 U	10 U
-Nitrophenol	10 U	20 U	22 Ü	10 U	10 U	10 ປ
,4-Dimethylphenol	10 U	20 U		26 U	26 U	26 U
enzoic acid	26 U	50 U	54 Ü 22 Ü	10 U	10 U	10 U
is (2-Chloroethoxy) methane	10 U	20 U		10 U	10 U	10 U
,4-Dichlorophenol	_ 10 U	20 U	22 U	10 U	10 U	1 * \$
,2,4-Trichlorobenzene	10 U	3 * %	18 * %	10 U	10 0	10 U
laphthalene	10 U	20 U	22 U	10 0	10 0	10 0
-Chloroaniline	10 0	20 U	22 U	10 U	10 U	10 0
lexachlorobutadiene	10 U	20 U	22 U	10 U	10 U	0 * %
-Chloro-3-methylphenol	10 U	3 * %	18 * *	10 U	10 U	, 10 U
2-Methylnaphthalene	10 U V	20 U	22 U 22 U	10 U	10 U V	10 0
lexachlorocyclopentadiene	- 10 U V	2 0 ∪	22 U		20 0 ,	
= Outside of EPA CLP QC limits.						

FW Batch Number: 0012L502	Client: TNUH	ANFORD B99-037	H1173 Work	Order: 1098500		Page: 1b
Cust ID:		B110B2	B110B2	B110B3	B110B3	B110B3
RFW#:	002	002 MS	002 MSD	003	003 REPREP	003 MS Repre
	10 U (K	20 U	22 U	10 U R	10 U	R 10
,4,6-Trichlorophenol,4,5-Trichlorophenol	_ 26 U \	50 U	54 U	26 U \	26 U	26
,4,5-Trichlorophenol	- 26 U \	20 U	22 U	10 U	10 U	10
-Chloronaphthalene	- 71 1 1	50 U	54 U	26 U	26 U	26
-Nitroaniline		20 U	22 U	10 U	10 U	10
imethylphthalate		20 U	22 U	10 U	10 U	10
cenaphthylene			22 U	10 U	10 U	10
,6-Dinitrotoluene			54 · U	26 U	26 U	26
-Nitroaniline	_ 26 U	50 U	20 * %	10 U	10 U	2 *
cenaphthene	10 U	4 * %			26 U	26
,4-Dinitrophenol	_ 26 U	50 U	54 Ü	26 U 26 U	26 U	45
-Nitrophenol	26 Ü	0 * %	10 %	10 U	10 U	10
ibenzofuran		20 U	22 U		10 U	0 *
,4-Dinitrotoluene		2 * %	16 * %	10 U		16
iethylphthalate	10 U	. 20 U	22 U	10 U	- - ·	10
-Chlorophenyl-phenylether		20 U	22 U	10 U		10
luorene	10 U	20 U	22 U	10 U	10 U 26 U	26
-Nitroaniline	26 U	50 U	54 U	26 U		26
,6-Dinitro-2-methylphenol		50 ט	54 U	26 U		10
-Nitrosodiphenylamine (1)	10 U	' 20 U	22 U	10 U	10 U	10
-Bromophenyl-phenylether	10 U	20 U	22 U	10 U	10 U	10
exachlorobenzene	10 U	20 U	22 U	10 U	10 U	1
entachlorophenol		0 * %	4 * %	26 U	26 U	44
henanthrene	10 U	20 U	√ 22 Ŭ	10 U	10 U	10
nthracene		20 U	22 U	10 U	10 U	10
i-n-Butylphthalate		20 U	22 U	10 U	10 U	10
luoranthene		20 U	22 U	10 U	10 U	10
yrene	10 71	5 * %	28 %	10 U	10 U	2 *
utylbenzylphthalate		20 U	22 U	10 U \	10 U	10
,3'-Dichlorobenzidine		20 U	22 U	10 U	10 U	10
enzo(a) anthracene		20 U	22 U	10 U	10 U	10
		20 U	22 U	10 U	10 U	10
hryseneis(2-Ethylhexyl)phthalate	_ 10 U	20 U	22 U	10 U	5 215°	3
i-n-Octyl phthalate		20 U	22 U	10 U	10 U	10
1-II-OCLY1 PHICHAIACE	- N 10 U	20 U	22 U	10 U	10 U	10
enzo(b) fluoranthene	_ \ 10 11	20 U	22 U	10 U	10 U	10
enzo(k)fluoranthene	10 U 10 U 10 U	20 U	22 U	10 U	10 U	10
enzo(a)pyrene	-) 10 U	20 U	22 U	10 U	10 U	10
ndeno (1,2,3-cd) pyrene	- 3) 10 U	20 ט	22 U	10 U	10 U	10
ibenzo(a,h)anthracene	- 5 10 U	20 U	22 U	וס ס 🕽	10 U	10
enzo(g,h,i)perylene	- 10 U V	1.	22 U	10 U Y	10 U	<i>y</i> 10
,4-Dioxane	- TO O /	, 200				

RFW Batch Number: 0012L50	Cust ID:	Client: 'B110B2		B110B2		B110B2		B110B3		B110B3		B110B3
	RFW#:	002	*	002 MS		002 MSD		003	•	003 REPR		003 MS
and the same of th		10	UR	20	Ü	22	U	10	UR	10	υR	10
Methyl methacrylate		10	ן ט	20	บ	22	U	10	ט /	10	ן ט	10
Pyridine		10	U		Ü	22	U	10	ט \	10	U \	10
N-Nitrosodimethylamine		10	ן מ	20	Ü	22	U	10	ט /	10	u	10
Ethyl methacrylate		10	ן ט		U	22	Ü	10	U	10	ט	10
2-Picoline		10	u	20	υ	22	Ū	10	U	10	ט	10
N-Nitrosomethylethylamine			וט	20	Ü	22	บ	10	ט	10	U	10
Methyl methanesulfonate		10		20	Ü	22	U	10	ט	10	ប	10
N-Nitrosodiethylamine		10	ט	20	U	22	U	10	ט	10	ט	10
Ethyl methanesulfonate		10	U	20	U	22	ซ	10	Ū	10	ט	10
Aniline		10	מ	20 20	บ	22	U	10	U	10	ט	10
Pentachloroethane		10	Ü	20 20	ប	22	U	10	U	10	ט	10
3-Methylphenol		10	ט		U	22	Ü	10	ט /	10	υ	10
N-Nitrosopyrrolidine		10	U	20	_	22	U	10	ם	10	ט \	10
Acetophenone		. 10	ט	20	Ü	22	บ	10	U	10	ט	. 10
-Nitrosomorpholine		10	ט	20	Ü		ט	10	U	10	ט ו	10
-Toluidine		10	ט	20	Ü	22	_	51	ט l	52	U	52
-Nitrosopiperidine		52	ט	100	U	110	Ü	10	U	10	บ	10
, a-Dimethylphenethylamir	ne	10	ט	20	U	22	U	10	U	10	ט	10
6-Dichlorophenol		10	U	20	U	22	U	10	ן ט	10	ט	10
lexachloropropene		10	ט	20	บ	22	U	10	n	10	บ	10
		10	ט	20	U	22	U	10	u	10	Ü	10
N-Nitroso-di-n-butylamine		10	U	20	U	22	U		ט	10	ū	10
Safrole		10	บ	20	U	22	U	10	a l	10	ט	10
1,2,4,5-Tetrachlorobenzer	ne	10	ט	20	U	22	U	10	ן ט	10	u l	10
Isosafrole		10	ט	20	U	22	U	10		10	u l	10
1,4-Naphthoquinone		10	ט	20	U	22	Ü	10	U	10	U	10
1,3-Dinitrobenzene		10	ט ∖	20	U	.22	U	10	บ	10	ט	10
Pentachlorobenzene		. 10	ט \	20	U	22	ט	10	Ü	10	ן ט	10
1-Naphthylamine		10	ט \	20	U	22	Ü,	10	ָ 	1	ן מ	10
2-Naphthylamine		10	ט	20	U	. 22	U ,	10	Ü	10	U	10
2,3,4,6-Tetrachloropheno	1	10	U	20	Ų	22	U	10	U	10	ซ	10
2,3,4,6-lettachiolophicho	<u></u>	. 10	U \	20	Ü	22	ប	10	U	10	_	10
1,3,5-Trinitrobenzene		10	υl	20	U	22	U	10	U	10	U	1
Diallate		10	ט ו	20	U	22	U	10	U	10		10
Phenacetin		10	บ	20	U	22	U	10	Ü	10		10
Diphenylamine		N 10	Ū	20	U	22	U	10	U	10	U	10
5-Nitro-o-toluidine		10	Ū	20	U	22	U	10	U	10		10
4-Aminobiphenyl		10	บ	20	U	22	ប	10	บ	10		10
Pronamide	hanal	52	ט	100	U	110	บ	51	บ ุ	52		52
2-sec-Butyl-4,6-dinitrop	1161101	- 52 52	υV				U	51	υν	52	ט י	52
Pentachloronitrobenzene_ *= Outside of EPA CLP QC			· '		-							

Cust	ID: B	110B2	1	B110B2	2	B110B2	B110B3	B110B3		B110B3			B110B3	;	
RFI	N#:	002		002 MS		002 MSD)	003	003			003 Reprep			EP
4-Nitroquinoline-1-oxide		21	UR	40	U	44	U	20	U	B	21	U	R	21	U
Methapyrilene		10	ן ט	20	U	22	U	10	U	1	10	U	`	10	U
Aramite		21	ט \	40	U	44	U	20	U	1	21	U	1	21	U
Chlorobenzilate		10	ט \	- 20	Ū	22	U	10	U	1	10	U	1	10	U
p-Dimethylaminoazobenzene		10	ט	20	U	22	U	10	U	1	10	U .	1	10	U
3,3'-Dimethylbenzidine		10	ן ט	20	U	22	U	10	U	1	10	U		10	U
2-Acetylaminofluorene		10	ט	20	บ	22	U	10	U	1	10	U		10	U
7,12-Dimethylbenz(a)anthracene		10	ט	20	U	22	U	10	U	1	10	U		10	U
Hexachlorophene		100	ט	200	U	220	U	100	ប	1	100	U	1	100	U
3-Methylcholanthrene		10	ע , ע	20	บ	22	บ	10	υ,		10	U	V	10	U
1,2-Diphenylhydrazine		10	n A	20	U	22	U	10	U	V	10	U	v	10	บ

(1) - Cannot be separated from Diphenylamine. *= Outside of EPA CLP QC limits.

Page: 2a

Recra LabNet - Lionville Laboratory

Semivolatiles by GC/MS, Appendix IX List Report Date Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Report Date: 01/25/01 09:44

RFW Batch Numb	er: 00124504	CTTCIIC . TOLD	HYNKOKD B33-03				
	Cust ID:	B110B3	SBLKJW	SBLKJW BS	SBLKLV	SBLKLV BS	
Sample	RFW#:	003 MSD	00LE1613-MB1 WATER	00LE1613-MB1 WATER	01LE0005-MB1 WATER	01LE0005-MB1 Water	
Information	Matrix:	WATER	1.00	1.00	1.00	1.00	
	D.F.:	1.00	ug/L	ug/L	ug/L	ug/L	
	Units:	ug/L	սց/ո	49/4	,		
		REPREP	1 * %	4 * %	8 * %	0 * %	
	Nitrobenzene-d5	11 * %	1 * %	4 * %	11 * *	5 * %	
Surrogate	2-Fluorobiphenyl	13 * %	2 * %	7 * %	7 * *	12 * %	
Recovery	p-Terphenyl-d14	43 %	0 * %	4 * %	6 * %	9 * %	
_	Phenol-d5	61 %	0 * %	4 * %	8 * %	2 * %	
	2-Fluorophenol	74 %	• •	0 * %	17 %	71 %	
2	2,4,6-Tribromophenol	98 %	0 * %	U " 10 £1			=====f1
**===	2,4,6-Tribromophenol	*=====================================		4 * %	10 U	10 * %	
Phenol		52 ₹	10 0	10 U	10 U	10 U	•
his (2-Chloroet	hyl)ether	10 U	10 U	4 * %	10 U	3 * %	
		56 ₹	10 U	10 U	10 U	10 U	
1 3-Dichlorobe	enzene	10 U	10 U		10 U	0 * %	
	enzene	8 * *	10 U	4 * %	10 U	10 U	
Renzvl alcohol	1	10 0	10 U	10 U	10 U	10 U	
1 2-Dichlorobe	enzene	. 10 0	10 U		10 U	10 U	
2-Methylnheno	1	10 U	10 U	10 U	10 U	10 U	
big/2-Chlorois	sopropyl)ether	10 U	10 U	10 U	10 U	10 U	
A-Methylpheno	l	10 U	10 U	10 U	10 U	2 * %	
N-Nitrogo-Di-	n-propylamine	10 * %	10 U	3 * %		10 U	
Wayachloroeth	ane	10 U	10 U	10 U		10 U	
	****		10 U	10 U		10 U	
MILIODENZONO		10 U	10 U	10 U		10 U	
Isobiotone		10 U	10 U	10 U	10 U		
2-Nitrobuenor	heno1	10 U	10 U	10 U	10 U	10 U	
			25 U	25 U	25 U	25 U	
Benzoic acid_	thoxy) methane	10 U	10 U	10 U	10' U	10 U	
bis (2-Chloroe	thoxy/methane	_ 10 U	10 U	10 U	10 U	10 U	1
2,4-Dichlorop	henol	\sim	10 U	4 * %	10 U		
1,2,4-Trichlo	robenzene	10 11	10 U	10 U	10 U		
Naphthalene		. \ \ = :	10 U	10 U			
4-Chloroanili	neadiene		10 U	10 U	10 U	_	
Hexachlorobut	adiene	- 3 9 * 8	10 U	3 * %			
4-Chloro-3-me	thylphenol		10 U	10 U	10 U		
2-Methylnapht	halene		10 U		10 U	10 U	
Hexachlorocyc	lopentadiene	. 10 0					
*- Outside of	EPA CLP QC limits.				•		

-	Cust ID:	B110B3	SBLKJW	SBLKJW BS		SBLKLV		SBLKLV BS		
	RFW#:	003 MSD REPRES	00LE1613-MB	1 00LE1613-ME	B1	01LE0005-MB	1	01LE0005-MB1		
,4,6-Trichlorophenol_		10 U		U 10	U	10		10 U		
,4,5-Trichlorophenol_		26 t	J 25	ប 25	U		U	25 U		
-Chloronaphthalene		10 t	j 10	U 10	U	10		10 U		
2-Nitroaniline			j 25	ប 25	U	25		25 U		
Dimethylphthalate		10 t	J 10	U 10	U	10		10 U		
Acenaphthylene			J 10	U 10	U	10		10 U		
2,6-Dinitrotoluene		10 T	J 10	U 10	U	10		. = -	'.	
3-Nitroaniline		26 t	J 25	ປ 25	U	25		25 U		
			10	U 4 *	ક		U	6 * *		
Acenaphthene				0	U		U	25 U		
4-Nitrophenol			25	υ 0 *	*		U	23 %		
Dibenzofuran			10	U 10	U			10 U		
Theusorati			10	ប 2 *	*	10		2 * %		
2,4-Dinitrotoluene Diethylphthalate				U 10	U	10		10 U		
4-Chlorophenyl-phenyle	ether		j 10	ប 10	U	10		10 U	•	
Fluorene	J. 14 4			U 10	U	10		10 U		
Tuolene				ປ 25	U		U	25 U		
4-Nitroaniline 4,6-Dinitro-2-methylph	nenol		-	ប 25	U	25		25 U		
4,6-Dinitro-2-methyipi N-Nitrosodiphenylamine	nc.101			.ບ 10	U	10	U	10 U		
N-NITrosogiphenyiamine	ther			ប 10	U	- -	U	10 U		
4-Bromophenyl-phenylet	LIIGI			U 10	U		U	10 U		
Hexachlorobenzene				υ 0 *	*		U	11 %		
Pentachlorophenol			=	ປ 10	U	10	U	10 U		
Phenanthrene		4.0	່ງ 10	υ 10	U		U	10 U		
Anthracene Di-n-Butylphthalate			- "	ប 10	U		U	10 U		
DI-H-BULYIPHCHAIACE			່ງ 10	ប 10			U	10 U		
Fluoranthene			10	ប 5 *	웋		U	11 * \$		
Pyrene			-	U 10	U		U	10 U		
Butylbenzylphthalate_	<u> </u>		J 10	U 10	U	10	U	10 U	•	
3,3'-Dichlorobenzidine				U 10	U	10	U	10 U		
Benzo (a) anthracene			•		U		U	10 U		
Chrysene	alato		-	J 10	U	3	J	3 JE	3	
bis (2-Ethylhexyl) phtha	arace		-	บ 10	U	10	U	10 U		
Di-n-Octyl phthalate_		_			U		U	10 U		
Benzo (b) fluoranthene_			y 10		U		U	10 U		
Benzo(k) fluoranthene_	the state of the s	A)		U 10	U		U	10 U		
Benzo (a) pyrene		— 1	ບ 10	U 10	U		U	10 U		
Indeno(1,2,3-cd)pyreno	e	₹.	U 10		U		U	10 U		
Dibenzo (a, h) anthracen	C		_	U 10	U		U	10 U		
Benzo(g,h,i)perylene_ 1,4-Dioxane			_		U	10	U	10 U		

FW Batch Number: 0012L50	Cust ID:	B110B3		SBLKJW		SBLKJW BS		SBLKLV		SBLKLV BS				
RFW#:		003 MSD REPREP		00LE1613-MB1		00LE1613-MB1		01LE0005-MB1		01LE0005-MB1				
methacrylate		10	U	10	U	10	U	10			U			
yridine		10	U	10	U	10	U	10			U			
-Nitrosodimethylamine			Ū	10	U	10	U	10	U	10	U			
thyl methacrylate			U	. 10	U	10	U	10	U	10	U			
Picoline		10	U	10	U	10	U	10	U	10	U			
-Nitrosomethylethylamine	· · ·		U	10	U	10	U	10	U	10	U			
		10	U	10	U	10	U	10	U	10	U			
ethyl methanesulfonate		10	U	10	U	10	U	10	U	10	U			
-Nitrosodiethylamine		10	ซ		U	10	U	10	U	10	U			
thyl methanesulfonate		10	บ		U	10	U	10	U	10	U			
niline			บ		U		U	10	U	10	U			
entachloroethane			U		Ü		U	10	U	10	U			
-Methylphenol			Ü		U		Ū		U	10	U			
-Nitrosopyrrolidine			Ü		U		U	10	U	10	U			
cetophenone			Ü		U		U	10	U	10	U	· ·		
-Nitrosomorpholine			U		U		U	10	U.	10	U			
-ToluidineNitrosopiperidine		52	U		Ü		U	50	U	50	U			
-Nitrosopiperidine		10	U		Ü		U	10	U	10	U			
, a-Dimethylphenethylamin	ne		U		Ü		U	10	U	10	U			
,6-Dichlorophenol		10	U		Ü	10	Ū		U	10	U			
exachloropropene		10	_	= -	Ü		Ü		U	10	U			
-Phenylenediamine		10	U.	= -	U	10	U		U	10	U			
-Nitroso-di-n-butylamine	9	10	U		บ		U		Ū	10	U			
Safrole		10	U		Ü	- -	Ü		Ū	10	U			
.,2,4,5-Tetrachlorobenzei	ne	10	U	- -	บ		U		U	10	U			
sosafrole		10	U	_ -	Ü		U		Ū	10	U			
, 4-Naphthoquinone		10	U		Ü		U		U	10	U			
,3-Dinitrobenzene		10	ט		Ü		U		บ	10	U			
entachlorobenzene		10	Ü		Ū		Ü		U		U			
-Naphthylamine		10	U		U	10	U		Ū	10	U			
-Naphthylamine		10	U		Ü	10	Ü		U	10	บ			
,3,4,6-Tetrachloropheno	1	10	U		U		U		Ū	10	U			
		10	U		_	=	U	10	_	10				
Diallate		10	U		Ü				U		U			
Phenacetin		10	U	10			U		U	10				
iphenylamine		10	U	10			Ü		U		บ			
-Nitro-o-toluidine		10	Ŭ	10			U		U		Ū			
4-Aminobiphenyl		V) 10	U	10					U		U			
Pronamide		10	U				U	50	U		Ü			
2-sec-Butyl-4,6-dinitrop	henol	× 52	ט			50	U		U	- -	Ü			
Pentachloronitrobenzene_		0 52	U	50	U	50	U	50	J	40	~			

000011

3/15/01

Lionville Laboratory, Inc.

PAH'S by HPLC / Method 8310

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1 Cust ID: B110B2 B110B3 BLK BLK BS BLK BSD Sample RFW#: 002 003 00LB1611-MB1 00LE1611-MB1 00LE1611-MB1 Information Matrix: WATER WATER WATER WATER WATER D.F.: 1.00 1.00 1.00 1.00 1.00 Units: ug/L ug/L ug/L ug/L ug/L Triphenvlene 50 * % 48 * % 62 * % 64 * % 58 * % Benzo(a) anthracene 0.14 U J 0.13 U J 0.13 U 68 * % 57 * % Chrysene 1.56 U 1.53 U 1.50 U 64 * * 58 * % Benzo(b) fluoranthrene 0.19 U 0.18 U 0.18 U 67 * % 59 * % Benzo(k) fluoranthrene 0.18 U 0.17 U 0.17 U 67 * % 59 * * Benzo(a)pyrene 0.24 U 0.23 U 0.23 U 63 * % 54 * % Dibenzo(a,h)anthracene 0.31 U 0.31 U\\/ 0.30 U 66 59 * % 0.44 U Indeno(1,2,3-cd)pyrene 0.45 U 0.43 U 68 % 58 * %

10/5/1/5/01

Menda

Report Date: 02/08/01 16:44

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP OC

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Client: TNU-HANFORD B99-037

RFW #: 0012L502

SDG/SAF #: H1173/B99-037

W.O. #: 10985-001-001-9999-00 Date Received: 12-07-2000

SEMIVOLATILE

Two (2) water samples were collected on 12-04-2000.

The samples and their associated QC samples were extracted on 12-08-2000, re-extracted on 01-03-2001 and analyzed according to criteria set forth in Lionville laboratory OPs based on SW 846 Method 8270C for client specified Semivolatile target compounds on 12-26-2000 and 01-09,22-2001.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- The samples were initially extracted and analyzed within required holding times; however, sample B110B3 was re-extracted outside of holding time. See item 4.
- Non-target compounds were not detected in the samples.
- 4. Samples in extraction batch 00LE1613-MB1 were spiked with 75ug of base-neutral surrogates and 50ug of acid surrogates. The percent (%) recoveries were adjusted accordingly. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 5. Fifty-two (52) of sixty-six (66) surrogate recoveries were outside acceptance criteria. Sample B110B3 was re-extracted on 01-03-2001, analyzed on 01-22-2001 and reported. The re-extract analyses did not meet criteria; however, no sample volume remained for further analyses. A copy of the Sample Discrepancy Reports (SDR) has been enclosed.
- 6. Thirty-three (33) of forty-four (44) matrix spike recoveries were outside EPA QC limits. The matrix spike analyses associated with sample B110B3 went to dryness during the extraction process. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 7. Twenty (20) of twenty-two (22) blank spike recoveries were outside EPA QC limits. A copy of the Sample Discrepancy Report (SDR) has been enclosed.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 7 pages, including page 2A.

C00028

_02-

- 8. The method blanks contained the common laboratory contaminant Bis(2-Ethylhexyl)phthalate at levels less than the CRQL.
- 9. Internal standard area criteria were not met for the method blank 01LE0005-MB1. The GC/MS instrument was inspected for possible malfunction and was judged to be functioning properly.
- A spectral search was performed for 1-Acetyl-2-thiourea, 2,5-Diaminotoluene, 1,4-10. Dinitrobenzene, O, O, O-Triethylphosphorothioate and 2-Cyclohexyl-4,6-Dinitrophenol. However, these compounds were not identified in any samples.
- "I certify that this sample data package is in compliance with SOW requirements, both 11. technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."
- As of January 27, 2001, Recra LabNet Philadelphia became Lionville Laboratory 12. Incorporated. Some Forms may still reference Recra LabNet Philadelphia.

J. Michael Taylor

President

Lionville Laboratory Incorporated

som/group/data/bna/tnu-hanford-12-502 doc

21

INECIAS O	ample Discrepancy Report (SUR)	SDR#: COEXIAN
Date: 12 6 ω	Batch: OULSUZ Parameter: OULS Samples: 23 Matrix: W Method: SW846/MCAWW/CLP/ Prep B	Batch: OUEIUI3
D. General Discrepancy Missing Sample/Extract Hold Time Exceeded Improper Bottle Type Note: Verified by [Log-In] or [Prep Grounds.]	Insufficient Sample Preservation Wrong Not Amenable to Analysis p) (circle)signature/date: evant specific results; attach data if necessary)	edLabel ID's Illegible
2. Known or Probable Causes Lack of Organization Lack of Training Lack of Discipline Lack of Resources Lack of Time Lack of Management St	(s) (To be used for trend analysis) Other (Please explain): upport	
3. Discussion and Proposed A Re-log Entire Batch Following Samples: Re-leach Re-extract Re-digest Revise EDD Change Test Code to Place On/Take Off Hold (cir	we Est as superior -1	of Dack ordered standards
4. Project Manager Instruction Concur with Proposed Acti Disagree with Proposed Acti Include in Case Narrative Client Contacted: Date/Person Add Cancel	on	- -
Verified re-[log][leach][extra included in Case Narrative Hard Copy COC Revised Electronic COC Revised EDD Corrections Complete		i filina
Route/Distribution of SDR initiator Lab Manager: M. Taylor Project Mgr: Stone/Care Section Mgr: Wesson/Da X QA (file): Schrenkel Data Management: Feld Sample Prep: Bickel/Kar	Route Distribution of Cor Metals: Doughty Inorganic: Perrone GC/LC: Pastor MS: Layman/Ryck Log-in: Keppel man Route Distribution of Cor Metals: Doughty Inorganic: Perrone GC/LC: Pastor MS: Layman/Ryck Log-in: Keppel Admin: Soos	mpleted SDR

RECRA Sample Discrepancy Report (SDR) SDR#: 00 MS418
Initiator: Tlaymum Batch: 00 12 L 502 Parameter RNA
Initiator: Tlaymu Batch: 00 12 L 502 Parameter: BNA Date: 10 10 12 L 502 Parameter: BNA Matrix Wafe
Client: TWO Human Method: SW846/MCAWW/CLP/ Prep Batch: polE/1/13
1. Reason for SDR
a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C Transcription Error Wrong Test Code Other
i at occided Disciebation
Missing Sample/Extract Container Broken Wrong Sample Pulled Label ID's Illegible Hold Time Exceeded Insufficient Sample Preservation Wrong Received Past Hold
improper bottle Type Not Amenable to Analysis
Note: Verified by [Log-In] or [Prep Group] (circle)signature/date:
c. QC Problem (Include all relevant specific results; attach data if necessary)
all sphes a surreputus very law
2. Known or Probable Causes(s) (To be used for trend analysis)
Lack of Organization Other (Please explain):
Lack of Training Lack of Discipline
Lack of Resources
Lack of Time
Lack of Management Support
3. Discussion and Proposed Action Other Description:
Re-log Entire Batch
Following Samples:
Re-digest
Change Test Code to
Place On/Take Off Hold (circle)
4. Project Manager Instructionssignature/date: // /////////////////////////////////
Disagree with Proposed Action; See Instruction
Include in Case Narrative Client Contacted:
Date/Person
Add Cancel
5. Final Actionsignature/date: Bernal Ma (1304 0) Rill Other Explanation
X Yerified re-[log][leach][extract][digest][analysis] (circle) Sample # 03 only
5. Final Actionsignature/date: Secret 12 13 of 01 8544 Other Explanation: Sample # W3 only Included in Case Narrative Hard Copy COC Revised Electronic COC Revised Electronic COC Revised
EDD Corrections Completed When Final Action has been recorded forward action has been recorded.
When Final Action has been recorded, forward original to QA for distribution and filing. Route/Distribution of SDR
Initiator Metals: Doughty
Lab manager: M. Taylor Inorganic: Perrone
Section Mar Wesson/Daniels
Section Mgr: Wesson/Daniels Z MS: Layman/Rycklak Log-in: Reppel
Data Management: Feidman Admin: Soos
Sample Prep: Bickel/Kauffman Other: OGO 029

L-WI-006/E-08/00

Sample Discrepancy Report (SDR) SDR # OUS/ 003
Initiator: Bernard Fdq Batch: 00 174502 Parameter: 0425
Date: 1/8/01 Samples: 3,3m-0 Matrix: W
Client: Method: SW846/MCAWW/CLP/ Prep Batch: OILECOS
1. Reason for SDR
a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C
b. General Discrepancy Wrong Test Code Other
Missing Sample/ExtractContainer BrokenWrong Sample PulledLabel ID's Illegible
Hold Time Exceeded Insufficient Sample Preservation Wrong Received Past Hold Improper Bottle Type Not Amenable to Analysis
Note: Verified by [Log-in] or [Prep Group] (circle)signature/date:
c. QC Problem (Include all relevant specific results; attach data if necessary)
Basefraction 003 mm lost during filtration 003 blaun down to Dryncoson N-EVAP
2. Known or Probable Causes(s) (To be used for trend analysis)
Lack of Organization Other (Please explain):
Lack of Training Lack of Discipline
Lack of Discipline Lack of Resources Gastuare the Medgy (Msn)
Lack of Time Lack of Management Support
Re-log
Entire Batch · Following Samples:
Re-leach Re-extract
Re-digest Revise EDD
Change Test Code to
Place On/Take Off Hold (circle)
4. Project Manager Instructionssignature/date: Concur with Proposed Action
Disagree with Proposed Action; See Instruction Include in Case Narrative
Client Contacted:
Date/PersonAdd
Cancel
5. Final Actionsignature/date: Other Explanation:
Included in Case Narrative
Hard Copy COC Revised Electronic COC Revised
EDD Corrections Completed
When Final Action has been recorded, forward original to QA for distribution and filing.
Route/Distribution of SDR Route Distribution of Completed SDR Metals: Doughty
Lab Manager: M. Laylor Inorganic: Perrone
Section Mgr. Wesson/Daniels 7 MS/Layman/Ryckiak
Log-in: Keppel
Sample Prep: Bickel/Kauffman Admin: Soos Other:

L-WI-006/E-08/00

000030

NECIM	pampie pisciepancy report (sur)	SDR#: 01MSOS1
Date: 1/24/04 Client: 1/34/14/14/14	Batch: OONLED Parameter: OCISH Samples: O(3.35.37) BIL BS Matrix: W Method: Prep B	latch: OIL Eaus
b. General Discrepancy	th Profile Error Client Request Sampler Error nscription Error Wrong Test Code Other Container Broken Wrong Sample Pulle	
Hold Time Exceeded Improper Bottle Type Note: Verified by [Log-In] or [Prep Gro	Insufficient Sample Preservation Wrong Not Amenable to Analysis	Received Past Hold
c. QC Problem (include all re	and spikes fail in all simples	
2. Known or Probable Causes Lack of Organization Lack of Training Lack of Discipline Lack of Resources Lack of Time Lack of Management S	Support	
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	led	
When Final Action has been Route/Distribution of SDR Initiator Lab Manager: M. Tayl Project Mgr: Stone/Car Section Mgr: Wesson/I X QA (file): Schrenkel Data Management: Fei Sample Prep: Bickel/K.	rey Johnson Daniels Z MS Layman/Ryc Log-in: Keppel Idman Admin: Soos	empleted SDR

Be



Analytical Report

Client: TNU-HANFORD B99-037

RFW#: 0012L502

SDG/SAF#: H1173/B99-037

W.O #: 10985-001-001-9999-00

Date Received: 12-07-00

POLYNUCLEAR AROMATIC HYDROCARBONS BY HPLC

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were extracted on 12-08-00 and analyzed utilizing Lionville Laboratory OP's based on SW-846 Method 8310 for a list of client specified Polynuclear Aromatic Hydrocarbon target compounds on 02-06-01.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. All cooler temperatures have been recorded on the chain-of-custodies.
- 2. The analytical hold time for these samples was exceeded as the required lamp for the fluorescence detector maintenance was back ordered from the manufacturer. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. All surrogate recoveries exceeded acceptance criteria. A copy of the SDR has been enclosed.
- 6. Twelve (12) of fourteen (14) blank spike recoveries were outside the laboratory control limits. A copy of the SDR has been enclosed.
- 7. No matrix spike recoveries were reported with this data package. A copy of the SDR has been enclosed.
- 8. As of January 27, 2001, Recra Labnet Philadelphia became Lionville Laboratory Incorporated. Some forms may still reference Recra Labnet Philadelphia.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 13 pages.

2

9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

President

Lionville Laboratory Incorporated

r:\group\hpic\narr\8310\2001\12-502tnu.doc

12-1201

Date



3

Initiator: L. Kauffmun Batch	: <u>00121502</u>	Paramete	er. <u>08310</u>
Date: <u>z/s/o/</u> Sampl	es: 002,003	Matrix:	water
Client: <u>Twu</u> Metho	d: SW846/MCAWW/CLP/	Prep Batch:	00LF1611
Reason for SDR a. COC Discrepancy Tech Profile Transcription b. General Discrepancy		Sampler Error or Other	1C-O-C
Missing Sample/Extract Cont Hold Time Exceeded Insur Improper Bottle Type Not	fficient Sample Pr	rong Sample Pulled eservation Wrong	Label ID's Illegible Received Past Hold
Note*: Verified by [Log-In] or [Prep Group] (circle			
c. Problem (Include all relevant specific	results; attach data if necessar	Y) All surrogale r	recoveries out of range.
c. Problem (Include all relevant specific	lmso. 12 targets out	of 14 in 1481-	s 4 MBI-T out of
range.	·		
		J	
2. Known or Probable Causes(s)	. //	· · · · · · · · · · · · · · · · · · ·	7.7
Interference contentes in	1 tighnylow on fla	in menous	le pttoleto
2	Y		
3. Discussion and Proposed Action	Other Description:		late for sumpote
Re-log Entire Batch	pee	for ave	talle for sumface
Following Samples:	reco	news,	
Re-leach			
Re-extract			
Re-digest	Λ		
Re-digest Revise EDD	Λ		
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000024

L-WI-006/E-01/01

Lionville Laboratory Sample Discrepancy Report (SDR) SDR #: 0/LC020

RECRA Sample Discrepancy Report (SDR) SDR#: 0160013
Initiator: F. h.eu Batch: 6012L502 Parameter. 68310 Date: Julior Samples: 3.3 Matrix: Matrix Client: The Harked Method: SW846/MCAWW/CLP/ Prep Batch: 60181611
1. Reason for SDR a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C Transcription Error Wrong Test Code Other b. General Discrepancy Missing Sample/Extract Container Broken Wrong Sample Pulled Label ID's Illegible Hold Time Exceeded insufficient Sample Preservation Wrong Received Past Hold Improper Bottle Type Not Amenable to Analysis Note: Verified by [Log-in] or [Prep Group] (circle)signature/date: C. QC Problem (Include all relevant specific results; attach data if necessary)
2. Known or Probable Causes(s) (To be used for trend analysis) Lack of Organization Lack of Training Lack of Discipline Lack of Resources Lack of Time Lack of Management Support
3. Discussion and Proposed Action Re-log Entire Batch Following Samples: Re-leach Re-extract Re-digest Revise EDD Change Test Code to Place On/Take Off Hold (circle) Other Description: Other Description:
4. Project Manager Instructionssignature/date:
5. Final Actionsigneture/date: Old Older Explanation: Verified re-[log][leach][extraci][digest][analysis] (circle) Included in Case Narrative Hard Copy COC Revised Electronic COC Revised EDD Corrections Completed When Final Action has been recorded, forward original to QA for distribution and filing.
Route/Distribution of SDR Initiator Lab Manager: M. Taylor Project Mgr. Stone/Carey/Johnson Section Mgr: Wesson/Daniels X QA (file): Schrenkel Data Management: Feldman Sample Prep: Bickel/Kauffman Route Distribution of Completed SDR Metals: Doughty Inorganic: Perrone GC/LC: Pastor MS: Layman/Rycklak Log-in: Keppel Admin: Soos Other:

Bechtel Hanf	ord Inc.		THAIN OF CHE	TOI	NV/C	ABADE					1500		г				OFS
Collector		Con	CHAIN OF CUS'		lepho		LAN	IAL	X 212				ļ.,	B99	9-037-11	Lake 3	11 6 21
Fahlberg/Johansen			Roeck		372-90					Project WEISS.		nator	Price Code 7N			Data T	ntuntonna, 15.
Project Designation ERDF Leachate Delisting	\nalysis		pling Location RDF							SAF No. 1399-037			Air Quality			45	Days
ERC96-034,0	239,042	ACT I	l Logbook No. I. 1517-1	COA RERDF22560						Method of Shipment Fed EX							\"- \.e
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			No. of Container(s)	1-		1	1-1			h)	, 		30)		2	1	1
Special Handling and/or St	orage			13%	Into	500mL	1000	Omi .	70000	b	OnL	1005	D				<u> </u>
			Volume	10	r :			To let	4	ס"		17	6	1000ml,	1000m1,	1000inl.	1000mL
පි				150	Arren.	Sulfides - 9030	P	400	Seellen () Special		ptal le - 9010	12	-14	See item (2) in Special	Chloro- Herbicides -	PesVPCBs -	See item (3) in Special
(m)	SAMPLE ANAI	LYSIS					12	4	Instructio	ons	- 1	- 1	ı	Instructions	EPASISI		Instructions
i (j											ĺ		Ì				
Sample No.	Matrix •	Sample Date	Sample Time	Ш			 		- l-							``	
B110B1	WATER	12.4.94	0700 PT	Ja	$\overline{}$		 			 							
B110B2	WATER			140			ļ			-			_				
B110B3	WATER	13.4.40	D9 45			<u> </u>	<u> </u>				<u> </u>		_	<u>×</u>		<u>*</u>	<u> </u>
B11266	WATER	5.4.00		<u> </u>		_ k	<u> </u>			<u> </u>			_	<u> </u>	<u> </u>	<u> </u>	x
B11266		12.4.0				·											
CIIAIN OF POSSESSIO	WATER	12.40		12	100												
elinquished By	Date/Time 1130	Sign/Pri		e/Time	117-		IAL IN	STRU	ICTION	NS							Matrix *
R.FRED IRFL	16 cog 12.4.00	RT	Rithorem		7'D JISJ	2 110	1999 \$4	och or	opy(Wate	er) (Gosiun	1-137, Co	balt-60.	Europ	piam-152, Eur	opium-154, E s	ropium-	5=Sall SE=Sediment
elimpothed By	Popletime Ry	PETOL	STONED IN Da	e/Time		(2) 83	IO_SVO	A_HPI	LC (Benz	o(a)anthrac	ene. Ben	zo(b)flu	orani)	ene. Dibenzia	h lanthracene	1	SO-Solid S-Shodee
History Constitution of the Name of the Na	12.4.00	EH-Thu	12B 3728	12	90	D (3) Se	mi-VQA	\ - 8 270)A (App I	X): Semi-V	/OA 82	70A (A)	pp (X	Add-On) [1,2 Cyclohexyl-4,	-Diohenylhyd	razine.	O-ON O-ON
BULCB 37	38 12.6.00	O Leganory	1 Di Morens	e/ {	are						,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		e yellalen jira,	ountropitent	••	A · Alu IJS · Donne Satisfs
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	<u> </u>	1-51	JEJY)	···			-	$\alpha \mathbf{v}_{1} \mathbf{v}_{1}$	LUGI	CAL CO	NTDA						WE Wipe L+Liquid
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elinquished By /	Date/Time	Received Dy		e/Time	7,3		**	4111	DAMPL	LE /SAM	IPLES.			ZT	-		İ
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ABORATORY Received By SECTION			O		Title						•	-				e/Time	
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4LEE.011 (10/00)														······································			

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	(c)	D	E
PROJECT:	ERDF		DATA PACKAGE	: H117)	
VALIDATOR:		LAB: LVI		DATE: 3/S	5/01
CASE:			SDG:	H1173	,
·		ANALYSES	PERFORMED		
CLP Volatiles	SW-846 8240 (cap column)	SW-846 8260 (packed column)	CLP Semivolatiles	SW-846 8270 (cap column)	SW-846 (packed column)
				X 8310	
SAMPLES/MATR	11X B/100	2 B/1015	3	1PA+	+
		RIIOR		earolyses	·

1. DATA PACK	AGE COMPLETEN	IESS AND CASE	NARRATIVE		_
Is technical				Y	es No N/A
Is a case nar					es No N/A
Comments:					
			·		
					
	**				
2. HOLDING T					
Are sample ho	· ·		o Mit		Yes No N/A
Comments:	DAH BIO	212V — (K ggl	- 2k h	ald time
	126(1)	- C Z X	an analy	12 1 a	Щ
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GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION		<i>(</i> ,)
Is the GC/MS tuning/performance check acceptable? Yes	No	N/A
Are initial calibrations acceptable? Yes	No	\ N/A /
Are continuing calibrations acceptable? Yes	No	\
Comments:		
4. BLANKS		
Were laboratory blanks analyzed? Yes	No	N/A
Are laboratory blank results acceptable? Yes	No	N/A
Were field/trip blanks analyzed? Yes	(No)	N/A
Are field/trip blank results acceptable? Yes	No	N/À
Comments: NOFB		
See surrogate + thereng accord		
PAHOL		
5. ACCURACY		
Were surrogates/System Monitoring Compounds analyzed? Yes) No	N/A
Are surrogate/System Monitoring Compound recoveries acceptable? Yes	No	N/A
Were MS/MSD samples analyzed?	No	N/A
Are MS/MSD results acceptable? Yes	NO	N/A
Comments: R all SV		
Jall PATT NO MS/MSD		
		

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION	
Are MS/MSD RPD values acceptable? Yes	No N/A
Are field duplicate RPD values acceptable? Yes	No N/A
Are field split RPD values acceptable?	No N/A
• • • • • • • • • • • • • • • • • • •	
7. SYSTEM PERFORMANCE	
Were internal standards analyzed? Yes	No No
Are internal standard areas acceptable? Yes	No M
Are internal standard retention times acceptable? Yes Comments:	No (N/A)
8. COMPOUND IDENTIFICATION AND QUANTITATION	
Is compound identification acceptable? Yes	No NA
Is compound quantitation acceptable? Yes Comments:	No (N/A)
-	
9. REPORTED RESULTS AND QUANTITATION LIMITS	
Are results reported for all requested analyses?	No N/A
Are all results supported in the raw data? Yes	No (N/A)
Do results meet the CRQLs? Yes	No N/A
Has the laboratory properly identified and coded all TIC? Yes Comments: See namely	No N/A

Date:

15 March 2001

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

ERDF Leachate Delisting Analysis

Subject: Inorganics - Data Package No. H1173-RLN (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Data Package No. H1173-RLN prepared by Recra Environmental Incorporated (RLN). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	С	See note 1
B110B3	12/400	Water	С	See note 1

¹⁻ ICP metals by 6010B; mercury by 7470A.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation
- Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times for mercury and ICP metals are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within six (6) months for ICP metals and 28 days for mercury.

All holding times were acceptable.

Blanks

Preparation (Method) Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations (in ug/L) less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

All preparation blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

Accuracy

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 25% and a sample result below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of 66.8%, all sodium results were qualified as estimates and flagged "J".

All other matrix spike recovery results were acceptable.

Precision

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPDs for chromium (47%) and iron (96%) were outside QC limits. Under the BHI statement of work, no qualification is required. All other duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. The reported detection limits for thallium, mercury and antimony were above the PQL in both samples. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

Completeness

Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to a matrix spike recovery of 66.8%, all sodium results were qualified as estimates and flagged "J". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The reported detection limits for thallium, mercury and antimony were above the PQL in both samples. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Sodium	J	All	MS recovery

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HAN	FORD]													
Laboratory: Recra LabN	et																
Case	SDG: H1									T		· · · · · ·				T	
Sample Number		B110B2		B110B3								ļ				 	
Remarks				Duplicate						ļ		 		 		 	
Sample Date		12/04/00		12/04/00				<u> </u>		Result	Τα	Result	TQ.	Result	a	Result	Ta
Inorganics	CRDL	Result	a			Result	Q	Result	<u> </u>	Kesurt	14	nesuit	- -	Iteacut	\ <u>``</u>	1100011	1=-
Silver	6	1.1		1.1	U					 	+-	 	+	 	+	 	+
Aluminum	31	22.7		26.0						 	 	 		 		 	
Arsenic	82	11.3		11.0			<u> </u>	ļ	-	 	┼			 	+	 	1
Barium	0.4	97.7	<u> </u>	99.4										 			
Beryllium	0.4	0.10		0.10	U			ļ	-		┼┈	 		 	+-		
Calcium	16	194000		197000		ļ			-	 	+-		+	 	-	 	-
Cadmium	3.3			0,30		ļ <u> </u>				 	+	 	+			 	+-
Cobalt	4.3	0.90	U_	0.90	٦			ļ		 		 	+	 	+-	 	+-
Chromium	2.7	40.9		25.2							—						
Copper	4.1	9.0		9.5				L			-	 		 		 	
Iron	100	128		44.9				<u> </u>	+-		┿	 		 		 	+
Mercury	0.03	0.10	U	0.10				<u> </u>			┿	 			+-	 	
Potassium	2200	23400		23500			_ _				+-	ļ	-	 	┰	 	
Magnasium	5000	57700		58800						 			-	 		 	+-
Manganese	1	0.73		0.20				ļ <u>.</u>		 	+	 		 	-	 	+-
Sodium	34	264000		253000	·			<u> </u>		 	+			+		+	+
Nickel	15			12.1	<u> </u>			ļ	-	ļ		 		 	-	 	+-
Lead	30			2.1			_	<u> </u>			+	 	+-		+	 	
Antimony	2	2.3	U	2.3				<u> </u>	-	ļ		 -			-	 	+-
Selenium	61	3.3	U	3.3				ļ	-	<u> </u>			+	 		 	+-
Silicon	5000	18500	J	18400							+-	 	+				-
Tin	35	2.6	Ü	2.6							-			 	+-	+	
Thallium	3	4.0	U	4.0		<u> </u>		ļ <u>.</u>							┽┈		
Vanadium	2.9	21.7	7	21.5						 		 		1	+-	 	+-
Zinc	2.3	2.4	1	2.9	<u> </u>	<u> </u>					+		+	 	+-		+-
Lillo					<u> </u>	ļ							- -		+	 	
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INORGANICS DATA SUMMARY REPORT 01/09/01

CLIENT: TNUHAMFORD B99-037 H1173 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

Sample	SITE ID	ANALYTE	haare –		REPORTING	DILUTION
2233422	22320000000000000000000000000000000000		RESULT	UNITS	LIMIT	FACTOR
-003	B110B3		77 <i>8</i> 74222	*****	********	*****
		Silver, Total	1.1 u	UG/L	1.1	1.0
		Aluminum, Total	26.0	UG/L	22.7	1.0
		Arsenic, Total	11.0	DG/L	2.4	1.0
		Barium, Total	99.4	DG/L	0.20	1.0
		Beryllium, Total	0.10 u	UG/L	0.10	1.0
		Calcium, Total	197000	UG/L	19.2	1.0
		Cadmium, Total	0.30 u	UG/L	0.30	1.0
		Cobalt, Total	0.90 u	UG/L	0.90	1.0
		Chromium, Total	25.2	UG/L	0.60	1.0
		Copper, Total	9.5	UG/L ·	0.90	1.0
		Iron, Total	44.9	UG/L	21.8	
		Mercury, Total	0.10 u	UG/L	0.10	1.0
	** **	Potassium, Total	23500	UG/L	40.9	1.0
		Magnesium, Total	58800	UG/L	6.7	1.0
		Manganese, Total	0.20 u	•	0.20	1.0
		Sodium, Total	253000 T	-	229	1.0
		Nickel, Total	12.1	UG/L	0.90	10.0
	•	Lead, Total	2.1 u	•		1.0
		Antimony, Total		•	2.1	1.0
		Selenium, Total	3.3 u	UG/L	2.3	1.0
		Silicon, Total	18400	UG/L	3.3	1.0
		Tin, Total		•	6.4	1.0
		Thallium, Total			2.6	1.0
		Vanadium, Total			4.0	1.0
		Zinc, Total	21.5	UG/L	0.80	1.0
			2.9	UG/L	0.40	1.0

3/13/01

INORGANICS DATA SUMMARY REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	result	UNITS	LINIT	FACTOR
******	********	学出去与生活的自由的自由的实现实现实现的自由的	24404422	*****	2000年10日本	****
-002	B110B2	Silver, Total	1.1 u	UG/L	1.1	1.0
		Aluminum, Total	22.7 u	UG/L	22.7	1.0
		Arsenic, Total	11.3	UG/L	2.4	1.0
		Barium, Total	97.7	UG/L	0.20	1.0
		Beryllium, Total	0.10 u	UG/L	0.10	1.0
		Calcium, Total	194000	UG/L	19.2	1.0
		Cadmium, Total	0.30 u	UG/L	0.30	1.0
		Cobalt, Total	0.90 u	UG/L	0.90	1.0
		Chromium, Total	40.9	UG/L	0.60	1.0
		Copper, Total	9.0	UG/L	0.90	1.0
		Iron, Total	128	UG/L	21.8	1.0
		Mercury, Total	0.10 u	UG/L	0.10	1.0
	1 v 16	Potassium, Total	23400	UG/L	40.9	1.0
		Magnesium, Total	57700	UG/L	6.7	1.0
		Manganese, Total	0.73	UG/L	0.20	1.0
		Sodium, Total	264000 J	UG/L	229	10.0
		Nickel, Total	13.6	UG/L	0.90	1.0
		Lead, Total	· 2.1 u	UG/L	2.1	1.0
		Antimony, Total	2.3 u	UG/L	2.3	1.0
		Selenium, Total	3.3 u	UG/L	3.3	1.0
		Silicon, Total	18500	UG/L	6.4	1.0
•		Tin, Total	2.6 u	UG/L	2.6	1.0
		Thallium, Total	4.0 u	UG/L	4.0	1.0
		Vanadium, Total	21.7	UG/L	0.80	1.0
		Zinc, Total	2.4	UG/L	0.40	1.0

3/13/01

Laboratory Narrative and Chain-of-Custody Documentation

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-037

RFW#: 0012L502

SDG/SAF#: H1173/B99-037

W.O.#: 10985-001-001-9999-00

Date Received: 12-07-00

METALS CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.

2. The samples were prepared and analyzed in accordance with methods checked on the attached glossary.

All samples were reported with ten fold dilutions for Sodium due to high concentrations of this analyte.

- 3. All analyses were performed within the required holding times.
- 4. All cooler temperatures have been recorded on the Chain of Custody.
- 5. All Initial and Continuing Calibration Verifications (ICV/CCVs) were within the 90-110% control limits (80-120% for Mercury) with the exception of the ending CCVs for Beryllium, Calcium, Cadmium, Chromium, Iron, Magnesium, Manganese, Nickle, Potassium, Sodium, and Zinc. There is no impact to the data as the associated samples were surrounded by CCVs that were in control.
- 6. All Initial and Continuing Calibration Blanks (ICB/CCBs) were within control limits (less than the PQL).
- 7. All preparation/method blanks (MB) were within method criteria {less than the Practical Quantitation Limit (3X the IDL), MB value less than 5% of the RCRA limit, or samples greater than 20X MB value}. Refer to the Inorganics Method Blank Data Summary.
- 8. All ICP Interference Check Standards were within control limits.
- 9. All laboratory control samples (LCS) were within the 80-120% control limits. Refer to form 7.
- 10. The matrix spike (MS) recovery for 1 analyte was outside the 75-125% control limits. Refer to the Inorganics Accuracy Report.

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 2 \ pages.

11. For analytes where the ICP MS is out-of-control, a post-digestion MS (PDS) and serial dilution are performed. A serial dilution is performed for Mercury. A PDS was prepared at meaningful concentration levels, due to high concentrations of the following analytes:

		PDS	PDS
Sample ID	<u>Element</u>	Concentration (ppb)	% Recovery
B110B2	Sodium	250,000	92.3

- 12. The duplicate analyses for 2 analytes were outside the 20% Relative Percent Difference (RPD) control limits. Refer to the Inorganics Precision Report.
- 13. For the purposes of this report, the data has been reported to the Instrument Detection Limit (IDL). Values between the IDL and the Practical Quantitation Limit (PQL) are acquired in a region of less-certain quantification.
- 14. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

VP, Laboratory General Manager

Lionville Laboratory

gmb/m12-502

31-09-01

Date



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			IAIN OF CUST	ODY/S							Page <u>i</u>	of JETI	
lector ahlberg/Johansen		Comps F Ro	ny Contact eck	Telephon 372-90				'roject Coordi VEISS, RL	nator P	rice Code	7N		rnaround
ject Designation RDF Leachate Delisting Ar	alysis	Sampl ERI	ing Location)F					SAF No. 399-037	A	ir Quality	; <u>.</u>	45	Days
			logbook No. 1517-1		COA RERDF22	2560	A	lethod of Ship Fed EX	ment	-			
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DSSIBLE SAMPLE HAZA		:	Preservation	None	HCl to pH <2 Casl 4C	2 Cool 4C	HNO3 to p	H Cool 4C	Cool 4C	Cool 4C	Cool 4C	H2\$O4 to pH <2 Cool 4C	IINO3 to pH
NON	→		Type of Container	P	aG	aG	aG	P	•	P	P	P	P
	•		No. of Container(s)	l					1 .	1	1	. 1	1
recial Handling and/or Sto	rage		Volume	120mL	250mL.	500mL	500mL	500mL	* 500mL	500mL	500mL	500mL ,	500mL
9. 9.	SAMPLE ANAL	YSIS		pH (Water) - 9040	TOC - 9060	Carbonyls - 8315 (Formsldehyde)	Mercury - 7470 - (CV		See item (1) in Special Instructions	TD\$ - 160.1	TSS - 160.2	Ammonia - 350.3	See item (2) in Special Instructions
Sample No.	Matrix *	Sample Date	Sample Time	建筑铁	耕物	#12	1400	"" """"有"。	洲地震	智思等	生體的性	WASHING.	
1081	VVATER	12-4.00	070017	4.00									
1082	WATER	12.4.00	0945	<u>× ·</u>	X	X	_ Х	×	×	X	x	X	X
1083	WATER	12.4.0 .	1015	x_	×	×	_х_	<u> </u>	メ	<u> </u>	人	×	X
1265	WATER	12.4.00	0975	DT									
1266	WATER	12.4.00		12.400						<u> </u>		<u> </u>	
quished By Quished By Quished By BORATORY Received B SECTION	Date/Time 130 Pate/Time 30 To Date/Time 60 Date/Time 60	Received By	RThoren Do Tored in Do LaB 3728 RThoren Pa	ertime ertime ertime ertime ertime ertime ertime	(1) is (2) is Their	CP Metals - 601 llium. Tin) SAMPLE RADIOLG NO TOTA	i (Bromide 0A (TAL): S DID N OGICAI AL ACTI MPLE /	S Chloride, Fluorio ICP Metals - 601 OT ORIGIN L CONTROL IVITY IS AS SAMPLES.	OA (Add-on) ATE IN LED ARI	(Arsenic, Lead	O Da	icon, te/Time	Matrix * S-Soil SE-Sediment SO-Soild S-Sholge W - Water O-OM A-Ala US-Dram Solids D1-Dram Liquids T-Fissue W1nWipe L-Lupud V-Vegetation X-Other
SPOSITION Disposal M	ethod			,		Dishor	v)				D:	HE HINE	

Data Validation Supporting Documentation Documentation

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	-8	(c)	D	E
PROJECT:	ERDP		DATA PACKAGE	: H1173	
VALIDATOR:	T4	LAB: Re	crt	DATE: 3/	1/01
CASE:			SDG:	H1173	
		ANALYSES	PERFORMED		
□ CLP/ICP	☐ CLP/GFAA	CLP/Hg	☐ CLP/Cyanide	D	0
☐ SW-846/ICP	□ SW-846/GFAA	☐ SW-846/Hg	☐ SW-846 Cyanide		0
SAMPLES/MATR	IX BI	1032	1003		
• • • • • • • • • • • • • • • • • • •			10.102		
			·		
			 		
					
			•		
I. DATA PACK	AGE COMPLETEN	IESS AND CASE	NARRATIVE		
Is technical Is a case nar	verification rative presen	documentation			Yes No N/A
Is technical Is a case nar Comments: 2. HOLDING T Are sample ho	verification rative presen	documentation	n present? .		res No N/A
Is technical Is a case nar Comments: 2. HOLDING T Are sample ho	verification rative presenting times	documentation at?	n present? .		Yes No N/A

A-1600018

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS		
Were initial calibrations performed on all instruments? Yes	No	[N/A]
Are initial calibrations acceptable? Yes	No	N/A
Are ICP interference checks acceptable? Yes	No	N/A
Were ICV and CCV checks performed on all instruments? Yes	No	N/A
Are ICV and CCV checks acceptable? Yes	No	N/A
Comments:		
4. BLANKS		
Were ICB and CCB checks performed for all applicable analyses? Yes	No	(N/A)
Are ICB and CCB results acceptable? Yes	No	N/A)
Were preparation blanks analyzed? Yes	No	N/A
Are preparation blank results acceptable?	No	N/A
Were field/trip blanks analyzed? Yes	Na	NYA
Are field/trip blank results acceptable? Yes	No	(N/A)
Comments: WOFD		
5. ACCURACY		
Were spike samples analyzed?) No	N/A
Are spike sample recoveries acceptable? Yes	No) N/A
Were laboratory control samples (LCS) analyzed? Yes	No	(N/A)
Are LCS recoveries acceptable? Yes	No	N/A
Comments: Sodium 3/UJ all (66.8)		
		
		
		
		

12000019

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION							
Were laboratory duplicates analyzed? Yes	No	N//					
Are laboratory duplicate samples RPD values acceptable?							
Were ICP serial dilution samples analyzed? Yes	No No	N/A					
Are ICP serial dilution %D values acceptable? Yes	No	NA NA					
Are field duplicate RPD values acceptable? Yes	No	•					
Are field split RPD values acceptable?	No	N/A					
Comments: Chromoum 4790	110	N/A					
1ron 96% > FD							
7. FURNACE AA QUALITY CONTROL							
Were duplicate injections performed as required? Yes	No	Ñ/À					
Are duplicate injection %RSD values acceptable? Yes	No	N/A					
Were analytical spikes performed as required? Yes Are analytical spike recoveries recoveries.	No	N/A					
Are analytical spike recoveries acceptable? Yes	No	1 .,					
Was MSA performed as required?	No	N/A					
Are MSA results acceptable? Yes Comments:	No	N/A					
8. REPORTED RESULTS AND DETECTION LIMITS							
Are results reported for all requested analyses? Yes	No	N/A					
Are all results supported in the raw data? Yes	No	(N/A					
Are results calculated properly? Yes	No	NA					
Do results meet the CRDLs?	No)	N/A					
Comments: thallum, antimony, mercury							

Additional Documentation Requested by Client

INORGANICS PRECISION REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173

RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

			INITIAL			DILUTION
Sample	SITE ID	ANALYTE	result	REPLICATE	RPD	FACTOR (REP)
*******	国民经营自己企业区企习支票的支持 发生	全位产品专名和美国市场基金是名誉在国际市场	*=====		*****	75222222222
-003REP	B110B3	Mercury, Total	0.10u	0.10u	NC	1.0

INORGANICS PRECISION REPORT 01/09/01

CLIENT: TNUHANPORD 899-037 H1173
WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

morac oras	BR: 10963-001-001-9999-	.00					
			INITIAL			•	DILUTION
Sample	SITE ID	ANALYTE	RESULT	REPLICATE	RPD		FACTOR (REP)
*****	***************	*************	******	2×2322732	*****		********
-002REP	B110B2	Silver, Total	1.1 u	1.1 u	NC		1.0
		Aluminum, Total	22.7 u	24.7	NC	200	1.0
		Arsenic, Total	11.3	9.9	13.2		1.0
		Barium, Total	97.7	99.0	1.3		1.0
		Beryllium, Total	0.10u	0.10u	NC		1.0
		Calcium, Total	194000	195000	0.65		1.0
		Cadmium, Total	0.30u	0.30u	NC		1.0
		Cobalt, Total	0.90u	0.90u	NC		1.0
		Chromium, Total	40.9	41.6	1.7		1.0
		Copper, Total	9.0	9.8	8.5		1.0
		Iron, Total	128	130	1.9		1.0
		Potassium, Total	23400	23700	1.3		1.0
	*	Magnesium, Total	57700	58200	0.84		1.0
		Manganese, Total	0.73	0.72	1.4		1.0
		Sodium, Total	264000	261000	1.2		10.0
		Nickel, Total	13.6	13.3	2.2		1.0
		Lead, Total	2.1 u	2.1 u	NC		1.0
		Antimony, Total	2.3 u	2.3 u	NC		1.0
		Selenium, Total	3.3 u	3.3	ЖÇ	200	1.0
		Silicon, Total	18500	18600	0.94		1.0
		Tin, Total	2.6 u	2.6 u	NC		1.0
		Thallium, Total	4.0 u	4.0 u	NC		1.0
		Vanadium, Total	21.7	21.9	0.92		1.0

Zinc, Total

Mr 1/9/01

1.0

11.8

2.4

2.7

INORGANICS ACCURACY REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173.

RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	sample	result	AMOUNT	*RECOV	FACTOR (SPK)
******	美工事实现基本是工作企业专业和基础企业企业	法法律的证据证据的证据证据证据证据证据证据证 证证			****		******
-003	B110B3	Mercury, Total	0.98	0.10u	1.0	98.1	1.0

INORGANICS ACCURACY REPORT 01/09/01

CLIENT: TNUHANFORD B99-037 H1173 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

			SPIKED	INITIAL	SPIKED		DILUTION
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT	*RECOV	FACTOR (SPK)
*****	*************	李 帝 自 法 李 董 音 医 医 医 左 李 等 医 题 是 医 是 以 以	======	*******	225444	*****	******
-002	B110B2	Silver, Total	49.7	1.1 u	50.0	99.4	1.0
		Aluminum, Total	2050	22.7 u	2000	102.5	1.0
		Arsenic, Total	2120	11.3	2000	105.6	1.0
		Barium, Total	2050	97.7	2000	97.7	1.0
		Beryllium, Total	50.4	0.10u	50.0	100.8	1.0
		Calcium, Total	215000	194000	25000	85.0*	1.0
		Cadmium, Total	50.6	0.3 0 u	50.0	101.2	1.0
		Cobalt, Total	487	0.90u	500	97.4	1.0
		Chromium, Total	237	40.9	200	98.2	1.0
		Copper, Total	255	9.0	250	98.3	1.0
		Iron, Total	1110	128	1000	97.9	1.0
		Potassium, Total	53800	23400	25000	121.7	1.0
	** **	Magnesium, Total	82900	57700	25000	100.8	1.0
		Manganese, Total	503	0.73	500	100.4	1.0
		Sodium, Total	281000	264000	25000	66.8*	10.0
		Nickel, Total	486	13.6	500	94.4	1.0
	•	Lead, Total	498	2.1 u	500	99.5	1.0
		Antimony, Total	515	2.3 u	500	103.1	1.0
		Selenium, Total	2120	3.3 u	2000	105.8	1.0
		Silicon, Total	19300	18500	1000	85.6*	1.0
		Tin, Total	1010	2.6 u	1000	100.6	1.0
		Thallium, Total	2020	4.0 u	2000	101.1	1.0
		Vanadium, Total	522	21.7	500	100	1.0
		Zinc, Total	501	2.4	500	99.7	1.0

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/09/01

CLIENT: TNUHANFORD B99-037 H1173 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

Sample	SITE ID	ANALYTE	RESULT	UNITS	REPORTING LIMIT	DILUTION FACTOR
BLANKI	99L1851-MB1	Silver, Total	1.1 u	UG/L	1.1	********
		Aluminum, Total	22.7 u	•	22.7	1.0
		Arsenic, Total	2.4 u	UG/L	2.4 .	1.0
		Barium, Total	0.27	UG/L	0.20	1.0
		Beryllium, Total	0.10 u	•	0.10	1.0
		Calcium, Total	19.2 u	-	19.2	1.0
		Cadmium, Total	0.30 u	•	0.30	1.0
		Cobalt, Total	0.90 u		0.90	1.0
		Chromium, Total	0.60 u	-	0.60	1.0
		Copper, Total	0.90 u	•	0.90	1.0
		Iron, Total	21.8 u	UG/L	21.8	1.0
		Potassium, Total	40.9 u	•	40.9	1.0
	****	Magnesium, Total	8.8	UG/L	6.7	1.0
		Manganese, Total	0.20 u	•	0.20	1.0
•		Sodium, Total	22.9 u	UG/L	22.9	1.0
		Nickel, Total	0.90 u	UG/L	0.90	1.0
		Lead, Total	2.1 u	UG/L	2.1	1.0
		Antimony, Total	2.3 u	UG/L	2.3	1.0
		Selenium, Total	3.3 u	DG/L	3.3	1.0
		Silicon, Total	6.5	UG/L	6.4	1.0
		Tin, Total	2.6 u	UG/L	2.6	1.0
		Thallium, Total	4.0 u	UG/L	4.0	1.0
		Vanadium, Total	0.80 น	OG/L	0.80	1.0
		Zinc, Total	0.40 u	UG/L	0.40	1.0
BLANK1	00C0435-MB1	Mercury, Total	0.10 u	UG/L	0.10	1.0
BLANK2	00C0435-MB2	Mercury, TCLP Leachate	0.10 u	UG/L	0.10	1.0

Date:

15 March 2001

To:

Bechtel Hanford, Inc. (technical representative)

From:

TechLaw, Inc.

Project:

ERDF Leachate Delisting Analysis

Subject: Radiochemistry - Data Package No. H1173-ES (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-ES which was prepared by Eberline Services (ES). A list of samples validated along with the analyses reported and the requested analytes is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/14/00	Water	С	See note 1 & 2
B110B3	12/14/00	Water	С	See note 1
B11266	12/14/00	Water	Ċ	See note 2

^{1 -} Gamma spectroscopy; gross alpha and beta;

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas -Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analysis is 6 months.

^{2 -} Carbon-14; technetium-99; and total uranium.

All holding times were acceptable.

Laboratory (Method) Blanks

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the required detection limit (RDL), the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the minimum detectable activity (MDA) are qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

All laboratory blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

Accuracy

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample (LCS) and matrix spike (MS) recovery range is 70-130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to the LCS not being analyzed with the SDG, all technetium-99 results were qualified as estimates and flagged "J".

All other accuracy results were acceptable.

Precision

Analytical precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the contract required detection limit (CRDL) and the RPD is less than 20 percent, the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to RPDs outside QC limits, all gross alpha (86%) and carbon-14 (169%) results were qualified as estimates and flagged "J".

All other duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to ES for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPDs for gross alpha (25%) was outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

Detection Levels

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific PQL.

Completeness

Data package No. H1173-ES (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to RPDs outside QC limits, all gross alpha (86%) and carbon-14 (169%) results were qualified as estimates and flagged "J". Due to the LCS not being analyzed with the SDG, all technetium-99 results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE 1_OF 1
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Gross alpha Carbon-14	J	All	RPD
Technetium-99	J	All	LCS not analyzed w/SDG

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD				1																	
Laboratory: TR				1	•																
	SDG: H	1173		1																	
Sample Number		B110B2		B110B3		B11266															
Remarks				Duplicate																	
Sample Date		12/04/00		12/04/00		12/04/01															
Radiochemistry	CRDL	Result	Q	Result ·	a	Result	a	Result	a	Result	a	Result	a	Result	Q	Result	a	Result	Q	Result	a
Gross Alpha	3	47.9	J	62.2	J	not analyzed											_		_	<u> </u>	
Gross Beta	4	229		281		not analyzed					<u> </u>								L	ļ	
Carbon-14		-6.76	UJ	not analyze	d	51.1														<u> </u>	
Technetium-99		675	J	not analyze	d	770	J										L		L	<u> </u>	
Total Uranium (ug/L)		224		not analyze	d	288					_						L		L	<u> </u>	
Potassium-40		U	U	U	U	not analyzed													_		
Cobalt 60	25	U	U	U	U	not analyzed										ļ <u></u>				ļ	
Cesium 137	15	U	U	U	υ	not analyzed											Ш			ļ	
Radium-226		U	U		-	not analyzed	_	 											_		
Radium-228			U		_	not analyzed					ļ									ļ	
Europium 152	50		U			not analyzed											i		<u> </u>	ļ	
Europium 154	50		U		_	not analyzed	_										_		<u> </u>	ļ	_
Europium 155	50		U			not analyzed											-		_	}	
Thorium-228			U		-	not analyzed		ļ. <u>. </u>											_	<u> </u>	4
Thorium-232			U		_	not analyzed													_	 	
Americium-241			U		_	not analyzed			_								Н		-	ļ	
Uranium-238			U			not analyzed	_				<u> </u>								<u> </u>	 	+
Uranium-235		U	U	U	υ	not analyzed					┝	<u> </u>					H				+
			<u> </u>	 					_			_	_				\vdash		 	 	4
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TMA/RICHMOND SAMPLE DELIVERY GROUP H1173

R012038-01

DATA SHEET

B110B2

SDG <u>7588</u> Contact <u>Melissa C. Ma</u>	Client/Case no <u>Hanford</u> SDG H1173 nnion Contract TRC-SBB-207925
Lab sample id <u>R012038-01</u> Dept sample id <u>7588-001</u> Received <u>12/06/00</u>	Client sample id <u>B110B2</u> Location/Matrix <u>ERDF</u> <u>WATER</u> Collected <u>12/04/00 09:45</u> Custody/SAF No <u>B99-037-11</u> <u>B99-037</u>

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha Gross Beta Carbon 14 Technetium 99 Total Uranium (ug/L) Potassium 40 Cobalt 60 Cesium 137 Radium 226 Radium 228 Europium 152 Europium 154 Europium 155 Thorium 228 Thorium 232 Uranium 235 Uranium 238 Americium 241	12587-46-1 12587-47-2 14762-75-5 14133-76-7 7440-61-1 13966-00-2 10198-40-0 10045-97-3 13982-63-3 15262-20-1 14683-23-9 15585-10-1 14391-16-3 14274-82-9 TH-232 15117-96-1 U-238 14596-10-2	47.9 229 -6.76 675 224 UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU	9.2 6.5 27 31 27	3.4 2.1 45 11 1.6 250 12 13 23 51 33 43 46 19 51 51 1400 94	3.0 4.0 200 15 0.10 25 15		93A 93B C TC U_T GAM GAM GAM GAM GAM GAM GAM GAM

ERDF Leachate Delisting Analysis

3/13/01

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SUMMARY DATA SECTION
Page 13

TMA/RICHMOND SAMPLE DELIVERY GROUP H1173

R012038-02

DATA SHEET

B110B3

	7588 Melissa C. Mannion	Client/Case no Contract	Hanford TRC-SBB-207925	SDG_H1173
Lab sample id Dept sample id Received	R012038-02 7588-002 12/06/00	Client sample id Location/Matrix Collected Custody/SAF No	ERDF 12/04/00 10:15	WATER

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha Gross Beta	12587-46-1 12587-47-2	62.2 281	11 7.2	4.8	3.0	I	93A
Potassium 40 Cobalt 60	13966-00-2	U	1.4	2.1 440	4.0	ט	93B GAM
Cesium 137	10198-40-0 10045-97-3	ប ប		16 15	25 15	บ บ	GAM
Radium 226 Radium 228	13982-63-3 15262-20-1	ប ប		34		Ū	gam gam
Europium 152 Europium 154	14683-23-9	ΰ		71 36	50	ប ប	GAM GAM
Europium 155	15585-10-1 14391-16-3	ប ប		44 33	50 50	บ บ	GAM
Thorium 228 Thorium 232	14274-82-9 TH-232	u u		21		ΰ	gam gam
Uranium 235 Uranium 238	15117-96-1	Ū		71 49		U U	gam gam
Americium 241	U-238 14596-10-2	u U		1700 16		U U	GAM GAM

ERDF Leachate Delisting Analysis

3/13/01

DATA SHEETS
Page 2
SUMMARY DATA SECTION
Page 14

T M A / R I C H M O N D SAMPLE DELIVERY GROUP H1173

R012038-03

DATA SHEET

B11266

	DG 7588 ct Melissa C. Mannion	Client/Case no Contract	Hanford TRC-SBB-207925	SDG_H1173
Dept sample	id <u>R012038-03</u> id <u>7588-003</u> ed <u>12/06/00</u>	Client sample id Location/Matrix Collected Custody/SAF No	ERDF 12/04/00 10:15	<u>WATER</u> 899-037

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Carbon 14	14762-75-5	51.1	32	51	200	XI	C
Technetium 99	14133-76-7	770	27	11	15		TC
Total Uranium (ug/L)	7440-61-1	288	35	1.6	0.10		U_T

ERDF Leachate Delisting Analysis

3/12/01

DATA SHEETS
Page 3
SUMMARY DATA SECTION
Page 15

Laboratory Narrative and Chain-of-Custody Documentation

Page 1 of 1

1.0 GENERAL

Bechtel Hanford Inc. (BHI) Sample Delivery Group H1173 was composed of three water samples designated under SAF No. B99-037 with a Project Designation of: ERDF Leachate Delisting Analysis.

The samples were received as stated on the Chain-of-Custody documents. Any discrepancies are noted on the Eberline Services Sample Receipt Checklist.

2.0 ANALYSIS NOTES

2.1 Gross Alpha and Gross Beta Analyses

The RPD difference between sample B110B3 and its sample duplicate for gross alpha analysis was 86%, greater than the 3σ limit of 65%. No other problems were encountered during the course of the analyses.

2.2 Carbon-14 Analyses

The LCS percent recovery (81%) was below the 3 σ limits (86 to 114%), but within the laboratory protocol limits (80 to 120%). The MS percent recovery (83%) was also below the 3 σ limits (86 to 114%), but within the laboratory protocol limits (80 to 120%). No other problems were encountered during the course of the analyses.

2.3 Technetium-99 Analyses

No problems were encountered during the course of the analyses.

2.4 Total Uranium Analyses

No problems were encountered during the course of the analyses.

2.5 Gamma Spectroscopy Analyses

No problems were encountered during the course of the analyses.

Case Narrative Certification Statement

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data obtained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Muss Mammy.
Melissa C. Mannion
Program Manager

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Bechtel Hanford In	1C.		IAIN OF CUST			EANAL	YSIS			B	99-037-11	Page ~	PT IZ
Collector Fahlberg/Johansen		Compa F Ro	iny Contact leck	Telepha 372-9	ne No. 086			Project Coord WEISS, RL	inator	Price Code	7N	Data T	urnaround
Project Designation ERDF Leachate Delisting Analysis		Sampli ERD	ing Location H	1/73 () .		SAF No. B99-037		Air Qualit	у 🗆	45	Days
Ice Chest Na.	65 (10fi)		ogbook No. 517-1		COA RERDF22	560		Method of Shi Fed EX	pment				
Shipped To TMA/RECRA		Offsite	Property No.	400	15			Bill of Lading	SS BIL	7953	- 09	90	
POSSIBLE SAMPLE HAZARDS/	REMARKS		Preservation	HCL to pH <2 Copi 4C	HNO3 to pH	Cool 4C	Cool	IC HCI Cool 40					
NUNC		ľ	Type of Container	G	Р	aGs*	aGs	adis*					
		ŀ	No. of Container(s)	1 2	(2)	3	3	10	-				
Special Handling and/or Storage		Ì	Volume	Lebate	1000mL	40m	40m	L Deligo	-				
	SAMPLE ANALYSIS	·························		12 Ho	Gross Alpha; Gross Beta	Alcolois, Glycols, & Ketone - 2015	Alcoho Glycols, Keiones - (1-Butar Mathan	& Special 8015 Instructions. not,				,	
Sample No.	Matrix * Sar	nple Date	Sample Time						THE RES				
811081 17-04-00	WATER 72	4-00-	0700					I :					
811082 🗸	WATER / 12.	4.00	1 0945 -		X /								
B110B3 🗸	WATER LE	2.7.0	1015		x V							·	
B11265	WATER 12-/	1-00	0945	27									
B11266	WATER 12.4	שיםי	1015	12.400									
CHAIN OF POSSESSION		Sign/Print l	Names			IAL INSTR	UCTIO	ŊS		,		7, -	Matrix *
REINGUISHED BY STOPE	18:400 P	VOID ST	CAB 3728	12.4	Groton	tadione, I But	anol, 2-Cl	COA = 8260A (Appriorocthyl vinyl-ether	er-Allyl a	lechol, cis-1,2-Di	r e-1,2,2 trifluore chlorocthyle ne,	ethane.	S=Soli SE=Soliment SO=Solid S=Sludgs W = Water O=OH A=Alr
Relinduished By FCD - CKP PURS	Date/Time (1) Recei	てィノ	Agrir Dal	1-05- U	0	RADIOL NO TOTA	OGICA AL AC	NOT ORIGII LL CONTRO FIVITY IS AS SAMPLES.	LLED A	REA.	Oa		APAN DS=Dram Solids DL=Drum Liquids T=Ticase W)=Wipe L-Liquid V=Vegetasion X=Other
LABORATORY Received By	,,. <u></u>		····	Tid							Dat	c/Time	
SECTION FINAL SAMPLE Disposal Method DISPOSITION				······		Dispos	ed By				Dai	te/Time	

Fahlberg/Johansen Project Designation			CHAIN OF CU: Company Contact F Roeck		one No. 9086	EANA	L 1919	REQUE:	ST	I	399-037-11	Page 1 o
ERDF Leachate Delisti	ng Analysis		Sampling Location H	173	7588			WEISS, RL SAF No.	amarot.	Price Code	7N	Data Turn
SRC 94	-065 L	lofi) F	ield Logbook No. EL 1517-1	. / 🗸	COA			B99-037		Air Quali	ty 🗀	45 D
Shipped To KA	2.4.00		Offsite Property No.	1 4 11	· · ·	560		Method of Sh Fed EX				
POSSIBLE SAMPLE H			T + + +	100	5_	γ		Bill of Lading	Air Biy	753-	-09	90
None			Preservation	None	HC1 to pH <2 Coal 4C	Cool 4C	HNO3 to I		Cool 4C	- 1	1 1	
			Type of Container	P	aG	åG	aG	P	P	P	Cool 4C	H2SO4 to pH HN ☐ Cool 4C
Special Handling and/or	Storage		No. of Container(s) Volume	120mL	250mL	500raL	1	.1	1.		-	
				pH (Water) -	TOC - 9060	Carbonyls -	500mL) e 10900 1	2. sognit	500inL	500mL	500mL 50
	SAMPLE ANA	alysis .		9040	. 1	8315 Formaldalryde	Mercury +	Conflictivity - 9050	See item (i) i Special Instructions.	n TD\$ - 160.1	TSS - 160.2	Ammonia - See itt
Sample No.	Matrix *	Sample Dat	e Sample Time				•					lasta
11082	WATER	124.0	0700A				是形式		Tage Ton Length			
1083	WATER	15.4.00	0445	25								
1265 1266	WATER	12.4.0	////-/-///////////////////	12.4.00		V	0	Tuy	315			
CHAIN OF POSSESSIO		Sign/Prin	TOTE									
FORD REGION	Date/Time [] 3	2 Recrived By	A. Thoren Dates	Time 1130		INSTRUC			L			Matrix
Tho	Pale Time 1300		Date/I	14.00 300 2.4.00	(3) IGP M	in)	iromide, Ch (TAL); ICP	leride, Flueride, l Metals - 6910A (litrato, Nitri (Add-on) (A	te, Phesphate, Se rsenic, Lead, Se	ulfate)	S-Soli SE-Sedimen SO-Solid
言されている	Date/Time Alox		P. Thoren Date T	ine 5400 5.00	1			•	<u></u> •_'		/	\$ ~Sindge W = Water O=Oil
ulshed By CD - EXPINS	12.5.AM	H-CT 6	F 92 12-0	1me 15-17)		AMPLES	DID NO	T ORIGINA'	re in			A=Air DS=Drum Soi DL=Drum Lik T=Tissue
CO-EXPLASS	Date/Time W. M. Date/Time	Received By	- Aegur 12.	me 10. Am		O TOTAL		CONTROLL CON	ED ARE OCIATE	D .		Wi=Wipe L=Liquid V=Vegetation
ORATORY Received By			Date/Tin				i			72T 12/4/00	•	X=Other
L SAMPLE Disposal Meth	od			Title			:		· · · · · · · · · · · · · · · · · · ·		Date/Time	
E-011 (10/99)						Disposed By					Date/Time	

Bechtel Han	ford Inc.		C	HAIN OF CUS	TODY	SAR	ADI 1	E ANIAT	YOYO	DEG	rracy	773				20F3
Collector Fahlberg/Johansen			Comp	any Contact	Telepho 372-9	one No	D.	E ANAL	11919	Project	Coord			99-037-11		PTI
Project Designation ERDF Leachate Delisting	Analysis						88)		WEISS, SAF No			Price Code Air Qualit	7N y □		Turnaround 5 Days
In Change	49-065	(ref)	Field I	Logbook No.		CC				B99-037 Method	of Ship	ment	Quant	<i>y</i> ()		
Shipped To	٠٧٠٥٥			Property No.	DOP		RDF22	2360		Fed E		Air Bill i	†53 -	4/1/2	^	
POSSIBLE SAMPLE HAZ		I.				1	}-	1	<u> </u>	4.6	کہ	5.7	127 =	099	$\frac{\mathcal{O}}{1}$	
NONE				: Preservation	HNO3 to pH <2		+VaOH +9 Cool	HCl to pH <2	HNO3 to	pH NaOl >= 12	lo pH Gool 4C	None	Coal 4C	Cool 4C	Cool 40	Cool 10
		•		Type of Container	P	Del	ele	P	P			P	aG	aG	aG	aG
Special Handling and a co	.			No. of Container(s)	U	R	00	U	U	1 - 1	ele	0	2	2	2	,2
Special Handling and/or St	orage			Volume	500mL	50	QmL,	1000mL	1000m	L 100	750	1000ml	- 1000mL	1000mL	DOGGHA	1000mL
·			······································		Total Uranium	Sulfide	- 9030	Technolium-99	See item () in To	al - 9010	Carbon-1		Children Herbeiden	Pesi/PCBs	- See item (3) is
	SAMPLE ANA	LYSIS							Instructio		- 2010		Special Instructions.	EPASIN	8081	Special Instructions.
	:									.			/			
Sample No.	Matrix *	Sample	Date	Sample Time	排業	38.44		ar Est				na erec				
B1108 7 17.751.6	WATER	15.4.	-	0700	w	and the same of	(BO	Control of the Contro							建建器	
B110B2	WATER	13.4.	40 F	0945V	X			×	XV	1		X				
B110B3 /	WATER /	12.4	•••	1015					X,							
B11266	WATER	ाष्ट्राया	-	0597	Χ,			X-				*-	- A	07	RECE	MED
CHAIN OF POSSESSIO	WATER	12 · 4	Print N	1015	XV	- 1.		<u> </u>				Xx				
Relinguished By	Date/Time 113e	Kecajved B		R. Thore	Time 1130	$\overline{}$		AL INSTRE								Matrix *
RFLOO PF. 41 elimpaished By RINOV	en Date/Time 305	Received B	XST	$\sim \sim 12$	-4.0[Time 174	2 '	133}						ropium-152, Eur		-	S=Soll SE=Sediment SO=Solid
	< 17.U.MO	Eirl.op	Kعا		12.41	יווק	(7) (501)	 	A (App.L)	A Sami-V	3A82	204. (Ann :	nthene, Dibenz(s IX Add On) (1,2	Dishaudhad		of =Shidge W = Water O=Oil
Lot 2B 37	12.5.00		#1	A. Thoreon	7.5.07		2 64 - 95-1991	onouchzene, 1		uncureu, 2,	3-171#[JU	noioiliene,	2-Cyclohexyl-4,	0-dinitropha nol	+ /	A=Air DS=Drum Solids
Hingeishot By R. Thore	Date/Time o G	Referred B		Date	/Time			SAMPLI	ES DID	NOT O	RIGIN	ATE IN	4			DiOnun Liquids ToTissus Wi-Wips
elinquished By	Date/Time	Received By		O Date	<u> </u>	102	1	RADIOL NO TOT	AL AC	TIVITY	IS AS	LED A SOCIA	REA. TED			L=Liquid V=Vegetation
CO' EXP pu	Date/Time	Received By		tegwo 1	2-0-1	-h		WITH SA	AMPLE	/SAMP	LES.		RT	•		X=Other
•		RECEIVED BY	(Date:	Time				:				124.08	J		
ABORATORY Received By SECTION					Title				:			*****		Date	/Time	
INAL SAMPLE Disposal Me DISPOSITION	thod					···		Disposed	By					Date	/Time	
				-									•			1

Data Validation Supporting Documentation

WHC-SD-EN-SPP-001, Rev. 1

RADIOCHEMICAL DATA VALIDATION CHECKLIST

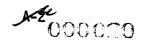
VALIDATION LEVEL:	A	В	(c)	D	E
PROJECT:	ERDF		DATA PACKAG	ie: 1+1173	
VALIDATOR:	T4	LAB: ES	erline	DATE: 3/1	101
CASE:		-	SDG: /-	+1173	
		ANALYSES	PERFORMED		
(Alpha/Beta	☐ Strontium-90	☐ Technetium-99	☐ Alpha Spectroscopy	Germma Spectroscopy	
☐ Total Uranium	☐ Redium-22	☐ Tritium	A for	XCM	x 1089
SAMPLES/MATR	ix B/	10BZ B	3110B3		
					
				w	ala
1. Completen	ess		. 		. DELN/A
Technical ver		ms nrasant?		Yes	(4.
	1110401011 101	ms bresenti			3 110 11771
Comments:					· · · · · · · · · · · · · · · · · · ·

			· · · · · · · · · · · · · · · · · · ·		
2. Initial C	alibration .	• • • • • •			🔯Ñ/A
Instruments/d	etectors cali	brated within	n		
				Ye	
	·			Ye	·
		•		Ye Ye	•
·					•
Comments:		· · · · · · · · · · · · · · · · · · ·			
					

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WHC-SD-EN-SPP-001, Rev. 1

3. Continuing Calibration	· ×	N/A
Calibration checked within one week of sample analysis? Yes	No .	N/A
Calibration about the table	No	N/A
	No	N/A
Calibration check standards expired? Yes	No	N/A
Comments:		
4. Blanks	. 0	N/A
Method blank analyzed?	No	N/A
Mothed blank manultages at 12 a	No	N/A
Amaliata a data to to to to to to to to to to to to to	_	N/A
T2-14 61-1/ \ - 1-	-	N/A
Field blank manula and the second to a	No (N/A)
Analyton detected to Et. I. I. I. S.	No (N/A)
Transcription/Calculation France	No (N/A)
Comments: NO FB		
		
F. Naturiy Calling		
5. Matrix Spikes	. 🗆	N/A
	No	N/A
	No '	N/A
	No (W/A
	No	WAY
Transcription/Calculation Errors? Yes	No	NA
Comments:		
•		



WHC-SD-EN-SPP-001, Rev. 1

6. Laboratory Control Samples	/A
LCS analyzed?	I/A
	i/A
LCS traceable? Yes No N	1/A
· ·	Ø
Comments: LCS not analyzed w/sog TC-99 T/UJ	
V	
	I/A
Chemical carrier added?	I/A
en la companya di managantan di managantan di managantan di managantan di managantan di managantan di managant	i/A
Chemical carrier traceable? Yes No	TA)
Chemical carrier expired? Yes No &	(ZÀ
Transcription/Calculation errors? Yes No	(A
Comments:	
8. Duplicates	I/A
Duplicates Analyzed? Yes No N	A/P
	A/N
Transcription/Calculation Errors? Yes No (N	V/A
Comments: GrA - Tall	
ch. 1 (C/4) 16920 Jall	

9. Field QC Samples	. [A/N E
Field duplicate sample(s) analyzed? Field duplicate RPD values acceptable? Field split sample(s) analyzed? Field split RPD values acceptable? Performance audit sample(s) analyzed? Performance audit sample results acceptable? Yes Comments: GA 2570	_	N/A N/A N/A N/A N/A
10. Holding Times Are sample holding times acceptable? Yes Comments:	No	N/A
11. Results and Detection Limits (Levels D & E) Results reported for all required sample analyses? Results supported in raw data? Results Acceptable? Transcription/Calculation errors? Yes MDA's meet required detection limits? Yes Transcription/calculation errors? Yes Comments:	No No No No No	

Additional Documentation Requested by Client

TMA/RICHMOND - SAMPLE DELIVERY GROUP H1173

R012038-08

MATRIX SPIKE

B11266

38-08 Lab sample id 008 Dept sample id	ORIGINAL R012038-03 Client sample 7588-003 Location/Matr 12/06/00 Collect	id <u>B11266</u> ix <u>ERDF</u> <u>WATER</u> ed <u>12/04/00 10:15</u>
	Custody/SAF	No <u>B99-037-11 B99-037</u>

ANALYTE	SPIKE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS		ADDED pCi/L	2σ ERR pCi/L		2σ ERR (COUNT)	REC 35 LMTS PROTOCOL 2 (TOTAL) LIMITS
Carbon 14	53000	540	140	200	х	С	63800	2600	51.1	32	83 86-114 60-140

ERDF Leachate Delisting Analysis

QC-MS#3 37013	

MATRIX SPIKES
Page 1
SUMMARY DATA SECTION
Page 12

TMA/RICHMOND SAMPLE DELIVERY GROUP H1173

R012038-07

DUPLICATE

B11266

SDG 7588 Contact Melissa C. Mannion DUPLICATE		Client/Case no <u>Hanford</u> SDG H1173 Case no <u>TRC-SBB-207925</u>
Lab sample id <u>R012038-07</u> Dept sample id <u>7588-007</u>	Lab sample id <u>R012038-03</u> Dept sample id <u>7588-003</u>	Client sample id <u>811266</u> Location/Matrix <u>ERDF WATER</u>
	Received <u>12/06/00</u>	Collected 12/04/00 10:15 Custody/SAF No B99-037-11 B99-037

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST .	ORIGINAL pci/L	2ø ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD %		PROT LIMIT
Carbon 14	4.29	28	46	200	u	С	51.1	32	51	J	169	232	
Technetium 99	791	38	12	15		TC	770	27	11		3	23	
Total Uranium (ug/L)	279	33	1.6	0.10		U_T	288	35	1.6		3	32	

ERDF Leachate Delisting Analysis

QC-DUP#3 37012		

DUPLICATES
Page 2
SUMMARY DATA SECTION
Page 11

TMA/RICHMOND SAMPLE DELIVERY GROUP H1173

R012038-06

DUPLICATE

B110B3

SDG 7588 Client/Case no <u>Hanford</u> SDG H1173 Contact Melissa C. Mannion Case no <u>TRC-SBB-207925</u> DUPLICATE ORIGINAL Lab sample id <u>R012038-06</u> Lab sample id <u>R012038-02</u> Client sample id <u>B110B3</u> Dept sample id <u>7588-006</u> Dept sample id <u>7588-002</u> Location/Matrix ERDF WATER Received 12/06/00 Collected 12/04/00 10:15 Custody/SAF No <u>B99-037-11</u> <u>B99-037</u>

ANALYTE	DUPLICATE pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ORIGINAL pci/L	2σ ERR (COUNT)	MDA pCi/L	QUALI- FIERS	RPD -%	3σ 101	PROT LIMIT
Gross Alpha	24.8	7.5	4.6	3.0		93A	62.2	11	4.8		86	65	
Gross Beta	268	7.0	2.2	4.0		938	281	7.2	2.1		5	32	
Potassium 40	U		290		U	GAM	U		440	u		JL	
Cobalt 60	U		20	25	U	GAM	Ü		16	u			•
Cesium 137	U		17	15	U	GAM	U		15	u	_		
Radium 226	U		28		Ü	GAM	บ		34	U	_		
Radium 228	ប		71		U	GAM	U		71	บ	_		
Europium 152	U		29	50	U	GAM	บ		36	ü	_		
Europium 154	U		47	50	u	GAM	U		44	u	_		
Europium 155	Ü		21	50	U	GAM	U		33	U			
Thorium 228	U		16		u	GAM	U		21	u	•		
Thorium 232	U		71		U	GAM	U		71	•	•		
Uranium 235	U		59		U	GAM	Ü		49	U	•		
Uranium 238	Ü		2200		U	GAM	u			U	•		
Americium 241	Ü.		14		U	GAM	U		1700 16	U	-		

ERDF Leachate Delisting Analysis

QC-DUP#2 37011	

DUPLICATES
Page 1
SUMMARY DATA SECTION
Page 10

TMA/RICHMOND SAMPLE DELIVERY GROUP H1173

R012038-04

LAB CONTROL SAMPLE

Lab Control Sample

SDG <u>7588</u> Contact <u>Melissa C. Mannion</u>	Client/Case no <u>Hanford</u> <u>SDG_H1173</u> Case no <u>TRC-SBB-207925</u>
Lab sample id <u>R012038-04</u> Dept sample id <u>7588-004</u>	Client sample id <u>Lab Control Sample</u> Material/Matrix <u>WATER</u> SAF No <u>B99-037</u>

ANALYTE	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	3σ LMTS (TOTAL)	PROTOCOL LIMITS
Gross Alpha	67.6	5.2	1.3	3.0		93A	71.7	2.9	94	69-131	70-130
Gross Beta	76.8	3.8	2.4	4.0		93B	80.7	3.2	95	77-123	70-130
Carbon 14	17300	180	62	200		c	21300	850	81	86-114	80-120
Technetium 99	2630	88	9.2	15		TC	2620	100	100	83-117	80-120
Total Uranium (ug/L)	84.5	9.6	0.16	0.10		U_T	82.5	3.3	102	77-123	
Cobalt 60	442	43	22	25		GAM	468	19	94	74-126	
Cesium 137	510	41	_35	15		GAM	554	22	92	76-124	

ERDF Leachate Delisting Analysis

QC-LCS 37009)		

LAB CONTROL SAMPLES
Page 1
SUMMARY DATA SECTION
Page 9

T M A / R I C H M O N D SAMPLE DELIVERY GROUP H1173

R012038-05

METHOD BLANK

Method Blank

	7588 Melissa C. Mannion	Client/Case no Contract	Hanford TRC-SBB-207925	SDG H1173
Lab sample id Dept sample id	R012038-05 7588-005	Client sample id Material/Matrix SAF No		WATER

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (COUNT)	MDA pCi/L	RDL pCi/L	QUALI- FIERS	TEST
Gross Alpha	12587-46-1	-0.294	0.58	1.2	3.0	Ü	93A
Gross Beta	12587-47-2	-0.261	1.0	1.8	4.0	Ū	93B
Carbon 14	14762-75-5	-10.2	27	46	200	Ü	C
Technetium 99	14133-76-7	-2.83	4.0	11	15	Ū	TC
Total Uranium (ug/L)	7440-61-1	0	0.007	0.016	0.10	Ū	U_T
Potassium 40	13966-00-2	ប		140		Ü	GAM
Cobalt 60	10198-40-0	U		17	25	U	GAM
Cesium 137	10045-97-3	U		13	15	Ū	GAM
Radium 226	13982-63-3	U		23	10	U	GAM
Radium 228	15262-20-1	U		51		U	GAM
Europium 152	14683-23-9	U		26	50	U	GAM
Europium 154	15585-10-1	Ü		42	50	u	
Europium 155	14391-16-3	Ū		17	50	U	GAM
Thorium 228	14274-82-9	Ū		12	30	Ū	GAM
Thorium 232	TH-232	Ū		51		บ	GAM
Uranium 235	15117-96-1	u		35		_	GAM
Uranium 238	U-238	บ		1600		U	GAM
Americium 241	14596-10-2	Ü				<u>U</u>	GAM
		J		11		U	GAM

ERDF Leachate Delisting Analysis

QC-BLANK 37010	

METHOD BLANKS
Page 1
SUMMARY DATA SECTION
Page 8

Date: 15 March 2001

To: Bechtel Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: ERDF Leachate Delisting Analysis

Subject: PCBs, Pesticides and Herbicides - Data Package No. H1173-RLN (SDG

No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	С	See note 1
B110B3	12/4/00	Water	С	See note 1

^{1 -} Pesticides/PCBs by 8081 and herbicides by 8151.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Water samples must be extracted within 7 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all nondetects are rejected and flagged "UR".

All holding times were met.

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than contract required quantitation limit (CRQL). If target compounds are present, sample results less than five times the blank concentration are qualified as undetected and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as undetected and elevated to the CRQL.

All method blank target compound results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

Accuracy

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike analyses are performed in duplicate and must be within control limits of 50% to 150%. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Nondetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

Due to sample not being analyzed with the matrix spike, all pesticide/PCB results in sample B110B2 were qualified as estimates and flagged "J".

All other matrix spike/matrix spike duplicate results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Nondetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. The RPD for liquid samples is ≤20% and ≤35% for soils. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs), to ensure that laboratory detection levels meet the required criteria. The following analytes had laboratory reported detection limits above the analyte specific PQLs:

alpha-BHC beta-BHC heptachlor
aldrin toxaphene dieldrin
4,4'-DDE endrin 4,4'-DDD
4,4'-DDT gamma-BHC (lindane) heptachlor epoxide

Aroclor-1221

Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

Completeness

Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to sample not being analyzed with the matrix spike, all pesticide/PCB results in sample B110B2 were qualified as estimates and flagged "J". Data flagged "J" is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following analytes had laboratory reported detection limits above the analyte specific PQLs:

alpha-BHC beta-BHC heptachlor aldrin toxaphene dieldrin

4,4'-DDE 4,4'-DDT

Aroclor-1221

endrin

4,4'-DDD

gamma-BHC (lindane)

heptachlor epoxide

Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.
 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Pesticides PCBs	J	B110B2	Sample not analyzed w/LCS

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFOR	D			ł													
Laboratory: Recra LabNet				{													
Case	SDG: H					-		т		· · · · · · ·		γ		<u> </u>		г	
Sample Number		B110B2		B110B3		<u> </u>		 		 	-	 				<u> </u>	
Remarks				Duplicate		 						<u> </u>		ļ			
Sample Date		12/04/00		12/04/00			T	 		 	T.		T	 	T-		т.
Pest/PCB	CRDL	Result	Q	Result	<u>a</u>	Result	0	Result	0	Result	a	Result	a	Result	<u> </u>	Result	10
Alpha-BHC	0.01	0.061	เกา	0.055			—	_		<u> </u>	-		╂	 	╄		4
Beta-BHC	0.019	0.061	เกา	0.055							ļ		╄	 	╁		┼
Delta-BHC		0.061	IJ	0.055		ļ		ļ	-	ļ	ļ		╄	 			┼-
Gamma-BHC (Lindane)	0.009	0.061	υJ	0.055	_	ļ			-	ļ	ļ		₩	<u> </u>	-		+-
Heptachlor	0.011	0.061	UJ		_	<u> </u>	┵	<u> </u>	┦	<u> </u>		<u> </u>	-	ļ	╄		╀
Aldrin	0.01	0.061	บม		U	 	4	 	-	 	├	 	-	 	-	 	4-
Heptachlor Epoxide	0.01	0.061	บม	0.055		 	4_	<u> </u>	—	 	 	ļ	╄	 	-	ļ	+-
Endosulfan I		0.061	บม			ļ	\bot	 				<u> </u>		 	+		┼-
Dieldrin	0.02	0.12	บบ	0.11	U	L	_		+	 	\vdash	ļ	↓ —	<u> </u>			╀
4,4'-DDE	0.01		_	0.11		 	_	 	+-	 	 	ļ	┼	 	+	 	+
Endrin	0.02	0.12	-	0.11	u	<u> </u>		ļ	_	<u> </u>	ļ			ļ	—	ļ <u>.</u>	╁
Endosulfan II		0.12			U_	<u> </u>	_	<u> </u>		<u> </u>	<u> </u>	ļ	↓	ļ	 		╄
4,4'-DDD	0.01	0.12			υ	ļ			4	<u> </u>	<u> </u>		ļ	ļ	┼┈	ļ	┼
Endosulfan Sulfate		0.12	υJ	0.11	U	 		<u> </u>	_	<u> </u>	┡		₩	<u> </u>		ļ	┼
4,4'-DDT	0.01	0.12		0.11	U	<u> </u>	Д	ļ	_	├	┞	<u> </u>	↓ —	ļ	-	ļ	┼
Methoxychlor		0.61	บม	0.55	U	<u> </u>		<u> </u>			<u> </u>		 	 	₩		┼
Endrin Ketone		0.12	-	0.11	_				_	ļ	⊢	ļ	 —	 			╀
Endrin Aldehyde			-	0.11	U	<u> </u>	_	<u> </u>		 			╁	ļ. ———	╂	ļ	+-
alpha-Chlordane		0.061	υJ	0.055			_		-		├-	ļ	-	 	+	ļ	┼—
gamma-Chlordane				0.055			_	ļ			╄	 	╁	ļ	1-		╁
Toxaphene	0.2	6.1	เกา	5.5	-	ļ	_	 		-			┼		╁	ļ	+-
Aroclor-1016	2		-			ļ	-	ļ		 	╀	 	╀	 	+-		╀
Aroclor-1221	2			2.2			-	ļ <u> </u>	- -	 	╁		╀		┼		╁
Aroclor-1232	2		+	1.1	U	ļ		_			├-	ļ <u> </u>	╂	 	┿	 	╁
Arochlor-1242	2		-	1.1	U	ļ				 	┼	 	╂		+	ļ	+
Arochlor-1248	2		+		_	<u> </u>		<u> </u>	-	ļ:	┼	ļ	┼	 	+	 	╁
Arochlor-1254	2			1.1	U	ļ		 		<u> </u>	┼-	ļ	┼—	 		ļ	╀
Arochlor-1260	2	1.2	เกา	1.1	U	 	+	ļ		 	↓_	 	+	 	┿	-	╀
			_	ļ	<u> </u>	<u> </u>	_			 	┼	 	 	 	╂	 	╁
Herbicides by 8151		L	辶		L_	ļ		 	-	ļ	ـ	 	┿		╄		+-
Dalapon		5.2			บม	 				ļ	+	 	╀	 	-		+
Dicamba		2.1	Π٦	2.1	υJ	 	-		-	 		ļ	+-	 	4		╀
Dichloroprop		5.2	-	5.2			_					 	+	 	4—	-	+-
2,4-D	4	1.0	บม	1.0	+	<u> </u>		 	-	ļ	┼		╀	 	1-		+-
2,4,5-TP (Silvex)		0.52		0.50			—		-	 _ _		 	↓_	 	—		╀
2,4,5-T		0.52		0.52	-	ļ	_	 	_		↓	ļ	+-	 	-	 	┼
2,4-DB			เกา	5.2	บป				-			 	+-		+		╄
Dinoseb		0.52	IJ	0.52	เกา	<u> </u>		ļ	_		╀-	 	+	 	+-	.	+
					1	1				1		i				<u> </u>	

Recra LabNet - Lionville Laboratory

Pesticide/PCBs by GC, CLP List

Report Date: 01/03/01 09:52 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1 RFW Batch Number: 0012L502

Cust ID: Sample RFW#: Information Matrix:		B110B2		B110B2	}	B110B2	2	B110B3	1	PBLKKC		PBLKKC BS	
		002 Water	002 MS Water	002 MS)	003 WATER	ļ.	00LE1618-M	в1	00 LE1618-MB1 WATER		
Intormacton	D.F.:	1.0	0	1.0	0	WATER 1.0	00	1.0	0	1.0	0	1.0	00
	Units:	UG/1		UG/L		UG/I		UG/I		UG/I	•	UG/I	្រ
Surrogate: Decachlore	nhinhenvl	67		68	*	75		54		85	*	61	*
Tetrachloro	-m-xvlene	88	*	62	8	68	8	70	ક્ર	80	*	85	윰
	*****	` (: :========	=fl==		=fl=:		=fl=:	*****	=f1	========	=f1	222222222	==f
Alpha-BHC		0.061	UJ	0.10	บ	0.10	บ	0.055	U	0.050	U	0.050	U
Beta-BHC		0.061	U	0.10	U	0.10	U	0.055	U	0.050	U	0.050	
Delta-BHC		0.061	U	0.10	U	0.10	U	0.055	U	0.050	U	0.050	Ü
Delta-BHC (Lindane)		0.061	ט	70	¥	70	*	0.055	U	0.050	U	85	ક
Heptachlor		0.061	U	75	ક	75	f	0.055	U	0.050	U	95	¥
Aldrin		0.061	U	70	ક	70	ક	0.055	U	0.050	U	85	ક
Heptachlor epoxide	<u></u>	0.061	ט	0.10	U	0.10	U	0.000	U	0.050	U	0.050	
Endosulfan I		0.061	U	0.10	U	0.10	U	0.00=	บ	0.050	U	0.050	
Dieldrin		0.12	ט /	- 82	*	80	*	0.11		0.10	U	100	ક
4,4'-DDE		0.12	ט	0.21	υ	0.21	บ	0.11		0.10	U	0.10	
Endrin		0.12	ע \	88	ક્ષ	94	*	0.11		0.10	U	118	ક
Bndosulfan II		0.12	ט /	0.21	U	0.21	U	0.11	U	0.10	U	0.10	
4,4'-DDD		0.12	ט \	0.21	U	0.21	U	0.11	U	0.10	U	0.10	
Endosulfan sulfate		0.12	บ	0.21	U	0.21	U	0.11		0.10	U	0.10	
4, 4'-DDT_		0.12	บ	90	ક્ષ	88	. ቔ	0.11		0.10	U	110	ક
Methoxychlor		0.61	U	1.0	U	1.0	U	0.55		0.50	U	0.50	
Endrin ketone		0.12	U	0.21	U	0.21	U	0.11		0.10	ប	0.10	
Endrin aldehyde		0.12	U	0.21	U	0.21	U	0.11		0.10	U	0.10	
alpha-Chlordane		0.061	ט	0.10	U	0.10	U		U	0.050	U	0.050	
gamma-Chlordane		0.061	ט	0.10	U	0.10	U	0.055	U	0.050	U	0.050	
Toxaphene		6.1	ט	10	ប	10	U		U	5.0	U	5.0	
Aroclor-1016		1.2	ט	2.1	U	2.1	ט	1.1		1.0	U	1.0	
Aroclor-1221		2.4	ט	4.1		4.1	U	2.2		2.0	U	2.0	
Aroclor-1232		1.2	ט	2.1		2.1	υ	1.1		1.0	U	1.0	
Aroclor-1242		1.2	ט	2.1	U	2.1	U	1.1		1.0	U	1.0	
Aroclor-1248		1.2	U	2.1	U	2.1	Ü	1.1		1.0	U	1.0	
Aroclor-1254		J 1.2	u /	2.1	U	2.1	U	1.1		1.0	U	1.0	Ü
Aroclor-1260		豆 1.2	UY	2.1	U	2.1	U	1.1	U	1.0	U	1.0	U

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

Recra LabNet - Lionville Laboratory

Herbicides, Special List

Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1

Cust ID: B110B2 B110B2 B110B2 B110B3 PBLKJY PBLKJY BS Sample RFW#: 002 002 MS 002 MSD 003 00LE1617-MB1 00LE1617-MB1 Information Matrix: WATER WATER WATER WATER WATER WATER D.F.: 1.00 1.00 1.00 1.00 1.00 1.00 Units: uq/L uq/L ug/L uq/L uq/L uq/L Surrogate: DCAA 109 옿 114 ¥ 110 왐 113 ş. 105 ¥. 112 ====f1=======f1======== Dalapon 5.4 U 85 5.2 U 5.0 U 옿 75 81 Dicamba 2.2 U 2.1 U 2.0 U 123 ş. 125 r. 127 ક Dichloroprop 5.4 U 104 96 5.2 U 5.0 U 103 2,4-D 1.1 U 108 96 1.0 U 1.0 U 112 2,4,5-TP (Silvex) 0.54 U 118 8r 118 ş. 0.52 U 0.50 U 108 2,4,5-T 0.54 U 132 116 뫔 0.52 U 0.50 U 130 2,4-DB 5.4 U 150 5.2 U 159 5.0 U 158 Dinoseb 0.54 U 119 117 0.52 U 0.50 U 117

P01-2501

Report Date: 01/18/01 13:5

3/30

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not reported. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of EPA CLP QC

000001

RFW Batch Number: 0012L502

Laboratory Narrative and Chain-of-Custody Documentation



Chemical and Environmental Measurement Information

Recra LabNet Philadelphia Analytical Report

Client: TNU HANFORD B99-037

RFW#: 0012L502

SDG/SAF#: H1173/B99-037

W.O.#: 10985-001-001-9999-00

Date Received: 12-07-00

PESTICIDE

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were extracted on 12-10-00 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 12-24,28-00. The extraction procedure was based on method 3520 and the extracts were analyzed based on method 8081.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature has been recorded on the chain-of-custody.
- All required holding times for extraction and analysis have been met.
- The method blank was below the reporting limits for all target compounds.
- 4. All surrogate recoveries were within acceptance criteria.
- 5. All blank spike recoveries were within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- 7. All initial calibrations associated with this data set were within acceptance criteria.
- 8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
- 9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

VP, Laboratory General Manager

Lionville Laboratory

Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 11 pages.



Chemical and Environmental Measurement Information

Recra LabNet Philadelphia Analytical Report

Client: TNU HANFORD B99-037

RFW#: 0012L502

SDG/SAF#: H1173/B99-037

W.O.#: 10985-001-001-9999-00

Date Received: 12-07-00

HERBICIDE

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were extracted on 12-08-00 and analyzed according to Recra OPs based on SW846, 3rd Edition procedures on 01-11-01. The extraction and analysis procedure was based on method 8151.

The following is a summary of the QC results accompanying the sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature has been recorded on the chain-of-custody.
- 2. All required holding times for extraction and analysis have been met.
- 3. The method blank was below the reporting limits for all target compounds.
- 4. All surrogate recoveries were within acceptance criteria.
- 5. All blank spike recoveries were within acceptance criteria.
- 6. All matrix spike recoveries were within acceptance criteria.
- 7. All initial calibrations associated with this data set were within acceptance criteria.
- 8. All continuing calibration standards analyzed prior to sample extracts were within acceptance criteria.
- 9. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

VP, Laboratory General Manager

Lionville Laboratory

Date

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The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical

data. Therefore, this report should only be reproduced in its entirety of 10 pages.

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Bechtel Hai	nford Irc.	CI	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST B99-037-11										of JET
Collector Fahlberg/Johansen			any Contact occk	Telephor 372-9				Project Coord WEISS, RL	linator	Price Code	7N		rnaround Days
Project Designation ERDF Leachate Delistin	g Analysis	Sampl ERI	ling Location DF					SAF No. B99-037		Air Quality	; ;	45	Days
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Special-Handling and/or	Storage		Volume	120inL	250mL	500mL	500m	L 500mL	500n	aL 500mL	500mi.	500mL	500mL
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Sample No.	Matrix *	Sample Date	Sample Time		144	2. 美国特勒。 图1. 第1.		and Trically 42		P. 154.5	李德 斯·	· · · · · · · · · · · · · · · · · · ·	0.11
B110B1	WATER	12.4.00	07001	4.00									
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B110B3	WATER	12.4.0	1015	X	X	K	_x_	<u> </u>	X		<u> </u>	¥	X
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B11266	WATER	12-4-00	1015	12400									
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LABORATORY Received SECTION	ed by		U	Fit	ie						D	ate/Time	
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Bechtel Hanfo	rd Inc.	CI	HAIN OF CUST	ror)Y/S	AMPLE	. A	NAL:	VSIS	RF	COUEST	•	Γ	B99	-037-11	Page 1	of 3
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FINAL SAMPLE Disposal Me DISPOSITION	thod							Dispos	ed By						Da	le/Time	

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	А	В	(c)	D	E	
PROJECT: T	PDE		DATA PACKAG	E: H17	3	
ALIDATOR: <	77]	LAB: Rec	PA	DATE: 3/	1/01	
CASE:	19		SDG:	41173		
		ANALYSES	PERFORMED			
CLP3/90	☐ SW-846 8080	SW-846 8081		¥ 8151	0	
SAMPLES/MATR	IX Bilo	132 B	110B3		·	
					·	
		×				_
				Wa	Ten	
s technical s a case nar		documentatio	NARRATIVE on present?		Yes No	N/A N/A
s technical s a case nar	verification	documentatio	on present? .			N/A N/A
s technical s a case nar comments: 2. HOLDING 1 Are sample ho	verification rative presen	documentationt?	on present? .		No No	N/A N/A N/A
s technical s a case nar comments: 2. HOLDING T Are sample ho Comments: 3. INSTRUME	verification rative presentative acceptable?	ATIONS		Yes No	N/A N/A	
s technical s a case nar omments: HOLDING Are sample ho comments: INSTRUME INSTRUME	verification rative presentative acceptable? CE AND CALIBRACE (METHOD 8	ATIONS 3080 AND 8081		Yes No	N/A N/A	
s technical s a case nar comments: 2. HOLDING 1 Are sample ho Comments: 3.1 INSTRUME Are DDT rete	verification rative presentative presentative presentative presentation times	acceptable? CE AND CALIBRANCE (METHOD & acceptable acceptable	ATIONS		Yes No	N/A N/A

PESTICIDE/PCB DATA VALIDATION CHECKLIST

the GC/MS tuning/performance check acceptable:	No \	N/AJ
mments:		
2 CALIBRATIONS (METHOD 8080 AND 8081)		
and the continue and	. /	
%RSD values acceptable?	No (N/A
re quantitation column calibration factor %RSD values acceptable?	No	N/A
ere the analytical sequence requirements met? Yes	No	N/A
re continuing calibration %D values acceptable? Yes	No	N/A
omments:		
Official Care Care Care Care Care Care Care Care		
.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW)	1	
las the initial calibration sequence performed? Yes	No '	N/A
Was the resolution acceptable in the resolution check mix? Yes	No	N/A
is resolution acceptable in the PEM, INDA and INDB? Yes	No	N/F
Are DDT and Endrin breakdowns acceptable? Yes	No	N/A
Are retention times in PEMs and calibration mixes acceptable? . Yes	No	N/A
Are RPD values in the PEMs acceptable? Yes	No	N/
Are %RSD values acceptable? Yes	No	N/
Comments:		
3.4 CALIBRATION VERIFICATION (3/90 SOW)		17
A A A A A A A A A A A A A A A A A A A		17.

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PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMs, INDA and INDB mixes? Yes	No	(N/A
Are RPD values in the PEMs acceptable? Yes	No	N/A
Are the DDT and endrin breakdowns acceptable? Yes	No	N/A
Was GPC cleanup performed? Yes	No	N/A
Is the GPC calibration check acceptable? Yes	No	N/A
Was Florisil cleanup performed? Yes	No	N/A
• •	No	N/A
Is the Florisil performance check acceptable? Yes	110	W.
Comments:		
4. BLANKS		
Were laboratory blanks analyzed? Yes)	No	N/A
Are laboratory blank results acceptable? Yes	No	N/A
Were field/trip blanks analyzed? Yes	No	N/A
Are field/trip blank results acceptable? Yes	No	(N/A)
Comments: NO FP		
5. ACCURACY	·	
Were surrogates analyzed? Yes	No	N/A
Are surrogate recoveries acceptable? Yes	No	N/A
Were MS/MSD samples analyzed? Yes) No	N/A
Are MS/MSD results acceptable? Yes	No	N/A
Were LCS samples analyzed? Yes	No	(N/A)
Are LCS results acceptable? Yes	No	N/A
Comments: B110BZ - next analyse w/sDs Jall		
		
·		<u>-</u> _

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PESTICIDE/PCB DATA VALIDATION CHECKLIST

6. PRECISION	/ •
Are MS/MSD RPD values acceptable:	A
Are laboratory duplicate results acceptable.	(A)
Are field duplicate RPD values acceptable? (Yes) No $\overline{ ext{N}}$	A
Are field split RPD values acceptable? Yes No	/A)
Comments:	 -
7. SYSTEM PERFORMANCE	
Is chromatographic performance acceptable? Yes No	YAY AX
Are positive results resolved acceptably? Yes No	1/A)
Comments:	
8. COMPOUND IDENTIFICATION AND QUANTITATION	
Is compound identification acceptable? Yes No	
Is compound quantitation acceptable? Yes No	M/9
Comments:	
	
9. REPORTED RESULTS AND QUANTITATION LIMITS	as / A
Are results reported for all requested analyses? Yes No	N/A N/A
Are all results supported in the raw data? Yes No	_
Do results meet the CRQLs? Yes	N/A
Comments:	
See nonate	

Date: 15 March 2001

To: Bechtel Hanford Inc. (technical representative)

From: TechLaw, Inc.

Project: ERDF Leachate Delisting Analysis

Subject: Volatiles - Data Package No. H1173-RLN (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-RLN prepared by Recra LabNet (RLN) or Lionville Laboratory Incorporated. A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation Level	Analysis
B110B1	12/4/00	Water	С	See notes 1,2,& 3
B110B2	12/4/00	Water	С	See notes 1, 2 & 3
B110B3	12/4/00	Water	С	See notes 1, 2 & 3

^{1 -} Volatiles by EPA 8260A

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 5 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. Preserved water samples must be analyzed within 14 days of the date of sample collection for VOA and alcohols.

² - Alcohols (butanol and methanol) by 8015B (8015M requested) and formaldehyde by 8315 (B110B2 and B110B3 only)

^{3 -} Diethyl ether was requested by 8015M but not reported (reported by 8260A).

Samples must be derivitized within 3 days and analyzed within 3 days for formaldehyde. If holding times are exceeded, but not by greater than twice the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than twice the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

All holding times were met.

Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples of a given matrix. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the project quantitation limit (PQL) and is less than five times (or less than ten times for laboratory contaminants) the highest associated blank result, the sample result value is raised to the PQL, qualified as undetected and flagged "U".

Due to laboratory blank contamination, all formaldehyde results were raised to the PQL qualified as undetected and flagged "U".

Due to laboratory blank contamination, all methylene chloride results were qualified as undetected and flagged "U".

Due to laboratory blank contamination, all acetone results were raised to the PQL qualified as undetected and flagged "U".

All other method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

Accuracy

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using the target compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike/matrix spike duplicate recovery results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provides a measure of system performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Samples with surrogate recoveries less than ten percent are qualified as estimates and flagged "J" for detects, and rejected and flagged "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification. Surrogates are not required for formaldehyde analysis.

All surrogate recovery results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of \pm 1.

samples and +/- 35% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All precision results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to RLN for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. Thirty-five analytes had reported analytical detection levels above the analyte specific PQL (see pages 11 and 12). Under the BHI validation SOW, no qualification is required.

Completeness

Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination, all methylene chloride results were qualified as undetected and flagged "U". Due to laboratory blank contamination, all acetone results were raised to the PQL qualified as undetected and flagged "U". Due to

laboratory blank contamination, all formaldehyde results were raised to the PQL qualified as undetected and flagged "U".

Thirty-five analytes had reported analytical detection levels above the analyte specific PQL/CRDL (see pages 11 and 12). Under the BHI validation SOW, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Ammended Record of Decision, Decision Responsiveness Summary, U.S. Environmental Protection Agency, Region X, Seattle, Washington.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validator in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a minor QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified major QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified major QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Methylene chloride Acetone Formaldehyde	U	All	Blank contamination

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFORD				1													
Laboratory: RECRA LabNet				1													
Case:	SDG: H1	173		1													
Sample Number	1000. 111	B110B1		B110B2		B110B3		1						1			
Remarks		5.105.		D11002		Duplicate		 	•••			 					
Sample Date		12/04/00		12/04/00		12/04/00				<u> </u>		 					
Analysis Date		12/15/00		12/15/00		12/15/00		 		<u> </u>		 				 	
VOA/Alcohols/Formaldehyde	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Tq.
Chloromethane*	2.3			10	U	10		resure	<u> </u>	Itesuit	<u> </u>	resure	<u> </u>	resuit	 	- Tresum	+-
Bromomethane*	1.4	 			u	10						 	†		╅	 	+-
Vinyl Chloride*	3.4				U	10			\vdash		\vdash		†		†	 	+
Chloroethane*	1	10	+	10	Ū		u	 	 		\vdash		+-		╁	 	+
Methylene Chloride	3.8		l u	10	_		U		 	 	<u> </u>		 	+	T	 	+
Acetone	9.7	9.7	_	9.7		9.7	_	ļ	t	1	t	<u> </u>	t	 	1	 	t
Carbon Disulfide*	0.74		Ü	5.7	U	5.7	U		 	 	 	 	†	 	\vdash		+
1,1-Dichloroethene*	0.74		U		U	+	_	 					1-		t	 	+
1,1-Dichloroethane*	1		U	5	U		u		 	<u> </u>	\vdash		t^-	 	 	 	+
trans-1,2-Dichloroethene	5		U		u	5	U			 	\vdash		╁		╁	<u> </u>	+
cis-1,2-Dichloroethene*	0.51		U		U	5	U	·		1	 		 		t		+
Chloroform*	0.86	5		5	u	5	Ū		 	·····	 	 	\vdash		 		+
1,2-Dichloroethane*	0.72	5		5	Ū	5	U		 			 	 		 	-	+-
2-Butanone*	2.1	10	Ü	10	υ	10	U		 -	<u> </u>	 				 	 	+
1.1.1-Trichloroethane*	0.89	5		5	U	5	u						\vdash		 	 	+
Carbon Tetrachloride*	0.71	5			U	5	U				 		 	 	\vdash		+
Vinyl Acetate*	3.6	10	U		υ U		U		<u> </u>		 		1		\vdash	<u> </u>	
Bromodichloromethane*	0.5	5	_		U		Ū				1		 		\vdash		
1,2-Dichloropropane*	1	5		5		5		<u> </u>			1		T	<u> </u>	\vdash		
cis-1,3-Dichloropropene*	0.51	5		5	_		Ū	 					 	<u> </u>	T	1	+-
Trichloroethene	10	5	Ū		U		Ū			 	 						_
Dibromochloromethane*	0.33	5		5	_		Ū								†===		T
1,1,2-Trichloroethane*	0.5	5			Ū	5	Ū		 	1					l		
Benzene*	0.84	5		.	u		U						\vdash				\vdash
trans-1,3-Dichloropropene*	0.29	5			Ū		U										
Bromoform*	0.36	5	Ū	5	Ū		U			-					T	 	\Box
4-Methyl-2-pentanone*	1	10	Ū	10			U										
2-Hexanone	10	10	Ū	10			U		l		t	İ	† ·				
Tetrachloroethene	10				U		U					1					
1,1,2,2-Tetrachloroethane*	1.5	5		5	υ		υ		<u> </u>								
Toluene*	0.79	5		5			U				1						
Chlorobenzene*	0.75	5			U		U		Ī			1			T		
Ethylbenzene*	1.3	5	_	5	υ		U										
Styrene*	0.64	5		5			υ					1	İ				
Xylenes (total)*	0.71	5			U	5	U						Ī				
Acrolein	21.4	20	_		υ	20	U										
Acrylonitrile*	1.7		Ū	5		5	U										
, 101 } 1011111110	1															_	

Project: BECHTEL-HANFORD]													
Laboratory: RECRA LabNet				1													
Case:	SDG: H1	1173		1													
Sample Number	1	B110B1		B110B2		B110B3											
Remarks						Duplicate			,	<u> </u>							
Sample Date		12/04/00		12/04/00		12/04/00											
Analysis Date		12/15/00		12/15/00		12/15/00											
VOA/Alcohols/Formaldehyde	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Trichlorofluoromethane	2	5	U	5	U	5	U										
Dichlorodifluoromethane*	2.3	10	U	10	υ	10	U										
Acetonitrile	23.5	20	U	20	U	20	U				T						
Idomethane		5	U	5	U	5	U										
Propionitrile (ethyl cyanide)		50	U	50	U	50	U										
3-Chloropropene*	1.2	10	U	10	U	10	U										
Methacrylonitrile*	2.2	10	U	10	U	10	U										
Dibromomethane		10	U	10	υ	10	U										
Isobutyl Alcohol	380	100	U	100	U	100	U										
1,2-Dibromoethane		10	U	10	U	10	U										
1,1,1,2-Tetrachloroethane	· · · ·	5	U	5	U	5	U										
1,2,3-Trichloropropane		10	U	10	U	10	U								<u>L</u> .		
trans-1,4-Dichloro-2-butene		20	U	20	U	20	U			1			<u> </u>			<u> </u>	
1,2-Dibromo-3-chloropropane		10	U	10	U	10	U		İ							<u> </u>	$oldsymbol{\perp}$
2-Chloro-1,3-butadiene		5	U	5	U	5	υ										
2-Chloroethylvinylether*	3.1	10	U	1	U	10	υ								1		
1,1,2-Trichlorotrifluoroethane		10	U	10	U	10	υ						<u> </u>				
Ethyl Acetate	10	10	υ	10	U	10	υ										ļ
Diethyl Ether		10	U		U	10	U			ļ			<u> </u>		_		
n-Butanol*	12.6	250	U	250	U	250	υ		<u> </u>							ļ	4
			L.,_						<u> </u>		ļ					<u> </u>	_
Alcohols by 8015B													<u> </u>	ļ		ļ	
Butanol**		5.0		5.0		5.0					<u> </u>	ļ	<u> </u>		_	ļ	1
Methanol**	5	5.0	U	5.0	U	5.0	U				╄					ļ	↓
									<u> </u>	ļ	ļ		↓		ļ	ļ	ļ
Formaldehyde by 8315					_	ļ			1		_	ļ	4		\bot	 	1
Formaldehyde	5000	Not analyzed		5000	U	5000	U		<u> </u>	ļ		<u> </u>	-	 		1	
			<u> </u>	L	<u> </u>	ļ	<u> </u>		1	ļ	↓	 	1—		-	1	_
* - Reported detection limit exeeds PQI	-		<u> </u>			<u> </u>			<u> </u>	<u> </u>	-	<u> </u>	_	ļ	1		+-
** - MG/L	_		ļ		<u> </u>				—	ļ	1		┼	<u> </u>	-	_	+
			<u> </u>				<u> </u>		-		\bot	 		 	-	ļ	+-
NA = Not Analyzed						1	<u> </u>		_	 	4—	 	+-	 	+		+-
			<u> </u>		<u> </u>	<u> </u>		ļ	 	 	+		-	+		-	+-
			<u> </u>			ļ	<u> </u>		-	 	╄	 	-	1			+
			l .					<u> </u>	1	<u></u>	<u> </u>	1	1	<u> </u>		<u> </u>	<u> </u>

Recra LabNet - Lionville Laboratory

Volatiles by GC/MS, Appendix IX List Report Date: 0
Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 1a

RFW Batch Number: 0012L502 B110B3 **VBLKII** B110B2 B110B1 B110B1 B110B1 Cust ID: 00LVN416-MB1 002 003 001 MSD 001 MS 001 RFW#: Sample WATER WATER WATER WATER WATER WATER Matrix: Information 1.00 1.00 1.00 1.00 1.00 1.00 D.F.: UG/L UG/L UG/L UG/L UG/L UG/L Units: 113 116 * % 110 103 108 1,2-Dichloroethane-d4 109 102 * 108 98 * 97 * 96 95 Toluene-d8 Surrogate * 89 92 98 86 ¥ Bromofluorobenzene Recovery $z_{z=z=z=f1}$ 10 U 10 IJ 10 U 10 U 10 U Chloromethane_____ 10 U 10 U -10 [[10 II IJ 10 10 П Bromomethane____ 10 U 10 [] 10 U 10 U 10 Vinyl Chloride 10 U 10 U IJ 10 U. Chloroethane 10 P 7 Br U В 1.2 13 Methylene Chloride_____ 9.7 2 JB" U 3 J JB JB 9.7 8 JEU Acetone П 5 U 5 TT U Carbon Disulfide 5 U ¥ 81 IJ 79 1.1-Dichloroethene____ Ħ 5 Ħ U U 1.1-Dichloroethane_____ IJ U TT trans-1,2-Dichloroethene_____ 5 U [] U Ħ Ccis-1,2-Dichloroethene____ П 5 U TT 11 Chloroform U 5 U IJ U 11 2.2-Dichloroethane_____ IJ 10 10 U 10 U 10 U 11 10 10 2-Butanone 5 U 5 Ħ 11 5 IJ 1.1.1-Trichloroethane 5 5 U U TT Carbon Tetrachloride____ 11 10 10 U 10 II 10 П 10 Vinvl Acetate Ħ 5 U П 5 IJ Bromodichloromethane_____ 5 U Ħ 11 1.2-Dichloropropane_____ U IJ 5 11 11 cis-1,3-Dichloropropene____ 11 92 U Trichloroethene 5 IJ 5 [] U Dibromochloromethane_____ 5 U 5 U Ħ 1.1.2-Trichloroethane____ IJ П 97 5 Ħ 92 Benzene U 5 U 5 11 5 U Ħ 5 Trans-1,3-Dichloropropene____ U 5 U 5 Ð U 5 TI Bromoform 10 10 U 10 [] 10 U U 10 4-Methyl-2-pentanone 10 [] 10 10 П 1.0 U 10 U 10 2-Hexanone IJ 5 II 5 [] 5 [] 5 U Tetrachloroethene *= Outside of EPA CLP QC limits.

Cust ID:	B1	10B	L	B110B	1	B110B	1	B110B	3	B110B3	3	VBLKII	
RFW#:	į	003	L	001 M	S	001 MSI	•	00:	2	003	,	00LVN416-	MB 1
1,1,2,2-Tetrachloroethane		5	U	5	Ü	5	U	5	Ü	5	U	5	τ
Toluene	ļ	5	U	99	¥	102	¥	5	U	5	U	5	ť
Chlorobenzene		5	U	99	윰	103	*	5	U	5	U	5	τ
Ethylbenzene		5	Ū	5	Ü	5	U	5	ט	5	U	5	U
Styrene		5	ับ	5	บ	5	U	5	U	5	U	5	U
Xylene (total)		5	U	5	U	5	U	5	U	5	U	5	U
Acrolein		20	U	20	U	20	U	20	U	20	U	20	U
Acrylonitrile		5	Ü	5	U	5	U	5	· D	5	U	5	U
Trichlorofluoromethane		5	U	5	U	5	U	2	J	1	J	5	U
Dichlorodifluoromethane		10	Ü	10	U	10	U	10	U	10	U	10	U
Acetonitrile		20	Ū	20	บ	20	U.	20	U	20	U	20	U
Iodomethane		5	Ü	5	บ	5	U	5	U	5	U	. 5	U
Propionitrile (Ethyl Cyanide)		50	U	50	U	50	U	50	U	50	U	50	Ū
3-Chloropropene	!	10	U	10	ט	10	ט	10	U	10	U	10	U
Methacrylonitrile		10	U	10	U	10	U	10	U	10	Ŭ	10	U
Dibromomethane	:	10	U	10	U	10	U	10	U	10	U	10	U
Isobutyl alcohol	1	.00	U	100	U	100	U	100	U	100	U	100	U
1,2-Dibromoethane		10	U	10	U	10	บ	10	U	10	U	10	U
1,1,1,2-Tetrachloroethane	i	5	U	5	U	5	U	5	U	5	U	5	U
1,2,3-Trichloropropane		10	U	10	U	10	U	10	U	10	U	10	U
trans-1,4-Dichloro-2-butene		20	ט	20	U	20	U	20	U	20	U	20	U
1,2-Dibromo-3-chloropropane		10	U	10	U	10	U	10	U	10	U	10	U
2-Chloro-1,3-Butadiene		5	U	5	ט	5	U	5	U	5	U	5	U
2-Chloroethylvinylether		10	U	10	U	10	U	10	Ū	10	U	10	บ
1,1,2-Trichlorotrifluoroethane		10	U	10	U	10	U	10	ប	10	U	10	U
Bthyl acetate	į	10	U	10	U	10	ប	10	Ū	10	U	10	U
Diethylether		10	U	10	U	10	บ	10	U	10	U	10	U
N-Butanol	2	50	U	250	U	250	U	250	U	250	U	250	U
*= Outside of EPA CLP QC limits.													



Volatiles by GC/MS, Appendix IX List

Report Date: 01/11/01 14:25 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 2a RFW Batch Number: 0012L502

Cust ID: VBLKII BS

Sample Information

*= Outside of EPA CLP QC limits.

RFW#: 00LVN416-MB1 WATER

Information	Matrix:	WATER	₹		
	D.F.:	1.	.00		
Units:		UG	/L		
1,2-D	ichloroethane-d4	108	· ·		
Surrogate	Toluene-d8	. 93	*		
	omofluorobenzene	86	*	•	
Chloromethane		10		========fl======fl===========fl=======fl======	=fl
Bromomethane		. 10	ָ " "		
Vinyl Chloride		10	U		
Chloroethane		10	U		
Methylene Chloride	}	. 11	В		
Acetone		3	JB		
Carbon Disulfide_		5	U		
1,1-Dichloroethene		79	*		
1,1-Dichloroethane		5	U		
trans-1,2-Dichloro	ethene	. 5	U		
cis-1,2-Dichloroet	:hene	5	U		
		5	_		
🕽 1,2-Dichloroethane		5	U		
Carbutanone		10			
1,1,1-Trichloroeth	ane	, 5	_		
7 Carbon Tetrachlori		5	-		
Vinyl Acetate		10			
Bromodichlorometha		5	_		
1,2-Dichloropropan		5	ប		
cis-1,3-Dichloropr		. 5	Ü		
Trichloroethene		97	*		
Dibromochlorometha		5	U		
1,1,2-Trichloroeth	ane	5	U		
Benzene		98	*		
Trans-1,3-Dichloro		5	U		
Bromoform		5	U	~ 7	
4-Methyl-2-pentano	ne	10	U		
2-Hexanone		10	Ü	<u>~</u> /	
Tetrachloroethene_		5	U	2	

RFW Batch Number: 0012L502 Client: TNUHANFORD B99-037 H1173 Work Order: 10985001001 Page: 2b

Cust ID: VBLKII BS

RFW#: 00LVN416-MB1

1,1,2,2-Tetrachloroethane	, 5	Ü	
Toluene	102	ક્ર	
Chlorobenzene	104	*	
Ethylbenzene	_	Ü	,
Styrene	5	U	
Xylene (total)	5	U	
Acrolein		U	
Acrylonitrile		U	
Trichlorofluoromethane		U	
Dichlorodifluoromethane	10	U	
Acetonitrile	20		
Iodomethane	<u> </u>	U	
Propionitrile (Ethyl Cyanide)	50		
3-Chloropropene	_i 10		
Methacrylonitrile	10	U	
Dibromomethane	10	Ū	
Isobutyl alcohol	100		
1,2-Dibromoethane	10		
1,1,1,2-Tetrachloroethane		Ŭ	
1,2,3-Trichloropropane			
trans-1,4-Dichloro-2-butene	20		
1,2-Dibromo-3-chloropropane	10		
2-Chloro-1,3-Butadiene	5	U	
2-Chloroethylvinylether	10	U	
1,1,2-Trichlorotrifluoroethane		U	
Ethyl acetate		U	
biethylether	10	Ū	
N-Butanol	250	U	
*= Outside of EPA CLP QC limits.			



Recra LabNet - Lionville Laboratory

Report Date: 12/13/00 09:50 HPLC scan Work Order: 10985-001-001-9999-00 Client: TNUHANFORD B99-037 H1173 RFW Batch Number: 0012L502 BLK BS ST BLK B110B3 B110B2 B110B2 B110B2 Cust ID: \Box 00LLC209-MB1 003 00LLC209-MB1 002 MS 002 MSD RFW#: 002 Sample WATER WATER WATER WATER WATER WATER Matrix: Information 1.00 1.00 1.00 1.00 1.00 1.00 D.F.: ug/L ug/L ug/L uq/L uq/L ug/L Units: 5000 25 BU 5000 20 BU 17 183 123 110 Formaldehyde

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked. % Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

3/13/01

Recra LabNet - Lionville Laboratory

GC SCAN

Report Date: 12/20/00 09:23

	Cust ID:	B110B1	B110B1	B110B	1	B110B2	B110B3	BLK
Sample Information	RFW#: Matrix: D.F.: Units:	WATER	001 MS WATER 1.00 mg/L	001 MS WATER 1. mg/l	00	002 WATER 1.00 mg/L	003 WATER 1.00 mg/L	00LLC210-MB1 WATER 1.00 mg/L
				1========	==fl==	======f1==	======f1	======f1
Methanol		5.0 U	96 %	102	*	5.0 U	5.0 U	5.0 U
Butanol		5.0 U	95 %	101	ŧ	5.0 U	5.0 U	5.0 U
	Cust ID:	BLK BS						
Sample	. RFW#:	00LLC210-MB1						
Information	Matrix:	WATER						
	D.F.:	1.00						•
	Units:	mg/L						

U= Analyzed, not detected. J= Present below detection limit. B= Present in blank. NR= Not requested. NS= Not spiked. %= Percent recovery. D= Diluted out. I= Interference. NA= Not Applicable. *= Outside of Advisory limits.

2)13/01

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000011

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Chemical and Environmental Measurement information Analytical Report

Client: TNU HANFORD B00-037

RFW #: 0012L502

SDG/SAF#: H1173/B00-037

W.O. #: #: 10985-001-001-9999-00

Date Received: 12-07-00

GC SCAN

The set of samples consisted of three (3) water samples collected on 12-04-00.

The samples and their associated QC samples were prepared and analyzed by methodology based on EPA Method 8015B for Methanol and Butanol on 12-11-00.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. The samples were packaged and stored as specified in the method protocol; the cooler temperature upon receipt has been recorded on the chain-of-custody.
- All required holding times were met for these samples.
- 3. All initial calibrations associated with this data set were within acceptance criteria.
- 4. All continuing calibration standards analyzed prior to the sample extracts were within acceptance criteria.
- 5. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria. Method performance is monitored through the use of blank spikes and matrix spikes.
- 6. All blank spike recoveries were within advisory control limits of 50%-150%.
- 7. All matrix spike recoveries were within the advisory control limits of 50%-150%.
- 8. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. The laboratory Manager or a designee, as verified by the following signature, has authorized release of the data contained in this hard-copy data package.

J. Michael Taylor

VP, Laboratory General Manager

Lionville Laboratory

r:\group\hplc-gcsc\narr\\gcvoa-scan\2000\12-502al..doc

10-60-10

Date

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 10 pages.

Chemical and Environmental Measurement Information

Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-037

RFW #: 0012L502

SDG/SAF#: H1173/B99-037

W.O. #: #: 10985-001-001-9999-00

Date Received: 12-07-00

LC SCAN

The set of samples consisted of two (2) water samples collected on 12-04-00.

The samples and their associated QC samples were prepared on 12-07-00 and analyzed using Recra OP's based on EPA Method 8315 for formaldehyde on 12-09-00.

The following is a summary of the QC results accompanying these sample results and a description of any problems encountered during their analyses:

- All initial calibrations associated with this data set were within acceptance criteria.
- 2. All continuing calibration standards analyzed prior to the sample extracts met acceptance criteria.
- 3. Recra does not use surrogate spikes for this analysis. The method does not provide specific guidance regarding the use of surrogates and performance criteria.
- 4. The blank spike recovery was outside the laboratory advisory control limits of 50%-150%.
- 5. The matrix spike recoveries were within the advisory control limits of 50%-150%.
- 6. The blank contained Formaldehyde above the reporting limit. The sample results have been flagged with a B. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 7. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

VP, Laboratory General Manager

Lionville Laboratory

12-20-00

Date

r:\group\hpls-gcscan\narr\aidehydes\12-502tnu..doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of

the analytical data. Therefore, this report should only be reproduced in its entirety of 10 pages.

000021



Client: INU-HANFORD B99-037

RFW #: 0012L502

SDG/SAF #: H1173/B99-037

W.O. #: 10985-001-001-9999-00 **Date Received: 12-07-2000**

GC/MS VOLATILE

Three (3) water samples were collected on 12-04-2000.

The samples and their associated QC samples were analyzed according to criteria set forth in Lionville laboratory OPs based on SW 846 Method 8260A for client specified Volatile target compounds on 12-15-2000.

The following is a summary of the OC results accompanying these sample results and a description of any problems encountered during their analyses:

- 1. The cooler temperature upon receipt has been recorded on the chain-of-custody.
- 2. All samples were analyzed within required holding time.
- 3. Non-target compounds were not detected in the samples.
- 4. One (1) of twenty-one (21) surrogate recoveries was outside EPA OC limits. The surrogate recovery of 1,2-Dichloroethane-d4 was biased slightly high in sample B110B2; however, there was no significant target compounds detected in the samples. The sample was not reanalyzed because of the holding time constraint. A copy of the Sample Discrepancy Report (SDR) has been enclosed.
- 5. All matrix spike recoveries were within EPA QC limits.
- 6. All blank spike recoveries were within EPA OC limits.
- 7. The method blank contained the common laboratory contaminants Methylene Chloride and Acetone at levels less than 2x the CROL.
- 8. Internal standard area and retention time criteria were met.
- 9. A spectral search was performed for compounds 1,3-Butadiene, Allyl Alcohol, Crotenaldehyde, Dichloropropanol, Isopropyl Benzene, 2,3-Dichloro-1-Propanol, Tetrahydrofuran and 1,3-Dichloro-2-Propanol; however, these compounds were not identified in the samples.
- "I certify that this sample data package is in compliance with SOW requirements, both 10. technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard-copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."
- 11. As of January 27, 2001, Recra LabNet Philadelphia became Lionville Laboratory Incorporated. Some Forms may still reference Recra LabNet Philadelphia.

J. Michael Taylor

02-12-0

Date

President

Lionville laboratory Incorporated

som\group\data\vos\tmu-hanford-12-502.doc

The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 1 4 pages.

RECRA Sample Discrepancy Report (SDR) SDR#: <u>(ン) VT (ふら</u>	
Initiator: DebYastral Batch: Ociz 1502 Parameter: (Xo74N) Date: 1/11/01 Samples: -002 Matrix: 1001-1001-1001-1001-1001-1001-1001-100	
1. Reason for SDR a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C Other Other Other Client Request Other O	
b. General Discrepancy Missing Sample/Extract Hold Time Exceeded Improper Bottle Type Container Broken Wrong Sample Pulled Preservation Wrong Received Past Hold Preservation Wrong Not Amenable to Analysis	
Note: Verified by [Log-In] or [Prep Group] (circle)signature/date: c. QC Problem (Include all relevant specific results; attach data if necessary); was + new. Sample had one Surveyore had advise fast hold (Dec. 18th, 2008). Please advise	
2. Known or Probable Causes(s) (To be used for trend analysis) Lack of Organization Lack of Training Lack of Discipline Lack of Resources Lack of Time Lack of Management Support	
3. Discussion and Proposed Action Re-log Entire Batch Following Samples: Re-leach Re-extract Re-digest Revise EDD Change Test Code to Place On/Take Off Hold (circle)	
4. Project Manager Instructionssignature/date: Concur with Proposed Action Disagree with Proposed Action; See Instruction Include in Case Narrative Client Contacted: Date/Person Add Cancel	
5. Final Actionsigneture/date: 60 + (Nature 1160) Other Explanation: Verified re-[log][leach][extract][digest][analysis] (circle) Included in Case Narrative Hard Copy COC Revised Electronic COC Revised Electronic COC Revised EDD Corrections Completed	
When Final Action has been recorded, forward original to QA for distribution and filling. Route/Distribution of SDR Initiator Lab Manager: M. Taylor Project Mgr. Stone/Carey/Johnson Section Mgr. Wesson/Daniels X QA (file): Schrenkel Data Management: Feldman Sample Prep: Bickel/Kauffman EDD Corrections Completed Route Distribution of Completed SDR Metals: Doughty Inorganic: Perrone GC/LC: Pastor MS: Layman/Rycklak Log-in: Keppel Admin: Soos Other:	

WIGH TIJ Bechtel Hanford Inc. CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST R99-037-11 offector Company Contact Telephone No. Project Coordinator Price Code 7N Data Turnaround F Roeck 372-9086 Fahlberg/Johansen WEISS RE 45 Days roject Designation Sampling Location SAF No. **Air Quality ERDF** Leachate Delisting Analysis ERDE B99-037 Field Logbook No. COA Method of Shipment EL 1517-1 RERDF22560 Fed EX 1111 of Lading/Air Bill No. 473678,6989 Offsite Property No. A \$10\$34 POSSIBLE SAMPLE HAZARDS/REMARKS HCL to pH <2 HNO to pH Cool 4C Cool 4C HCI Cool 4C Preservation Cool 4C None ₽G aCs* aGs* aCis* Type of Container No. of Container(s) 1000mL 40mL Special Handling and/or Storage Volume oil & Grease Alcohols. ice item (1) in 9070 Glycols, & Glyco Special etones - 801 Instructions SAMPLE ANALYSIS 11-Butsool Methanoli 1/1 Matrix * Sample Date Sample Time 班的第一生 9.53 PM 4.5 Sample No. 311081 WATER 1700 . 4.00 X 3110B2 WATER 12.4.00 x × 3110B3 WATER አ አ 12.4.00 111265 WATER 344266 WATER Sign/Print Names SPECIAL INSTRUCTIONS Matrix * CHAIN OF POSSESSION linguished By للمكية (1) VOA - \$260A (App IX); VOA - \$260A (App IX Add-On) 11,1,2-Trichloro-1,2,2-trifluoroethane. SE-Sediment 1,3-Butadiene, 1-Butanol, 2-Chloroethyl vinyl ether. Allyl alcohol, cis-1,2-Dichloroethylene, SO-Solid Crotonaldehyde, Dichloropropanol, Diethyl ether, Ethyl acetate, Isoprop S - Shulge W - Water 0-01 A-AW Dute/Time O400 DS=Drum Solids DL-Denn Liquid SAMPLES DID NOT ORIGINATE IN T-Tissue Date/Time RADIOLOGICAL CONTROLLED AREA. WI-Wipe L-Liquid NO TOTAL ACTIVITY IS ASSOCIATED \"=\"egctation Date/Time Date/Time WITH SAMPLE /SAMPLES. X=Other 26-00 0915 12/4/00 1.2.180 0915 Date/Time Date/Time

Disposed By

Date/Time

Date/l'ime

DISPOSITION
HI-EE-011 (10/99)

INAL SAMPLE | Disposal Method

ABORATORY SECTION 0945

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Received By

Bechtel Hanford Inc.			CHAIN OF COSTOD PROTESTING										or FET
:ctor			Company Contact Telephone No. F Rocck 372-9086						Project Coordinator WEISS. RL		Price Code 7N		rnaround
hiberg/Johansen eet Designation OF Leachate Delisting An	ialysis	Samp	Sampling Location ERDF						SAF No. B99-037 Air Quality			45 Days	
Theil No 10-034, D			Logbook No. 1517-1	COA RERDF2	COA RERDF22560		Method of Shipment Fed EX						
iped To RTC	2.4.00	7.5	e Property No.	·	<u> </u>	1235 453 - 0967,0978,0989							
SSIBLE SAMPLE HAZA	RDS/REMARKS	·	Preservation	None	HCl to pH <		HNO3 to (pH Cool 4C	Cool 40	Cool 4C	Cool 4C	112504 to pH <2 Cool 4C	HNO3 to pH
NON			Type of Container	P	aG	Ga	sG.	P	P	P	P	P	P
			No. of Container(s)	1	1	,			/ '.	1			1
ecial Handling and/or Sto	rage		Volume	120mL	. 250mL	500mL	500ml	L SOOmL	500mi	500mL	500mL	500mL	500mL
	Sample anai	.ysis		plf (Water) - 9040	TOC - 9060	Carbonyls - 8315 [Formaldchyde	Mercury 7470 - (C		See Item (1 Special Instruction	1	TSS - 160.2	Ammonia - 350.3	See item (2) in Special Instructions
Sample No.	Matrix *	Sample Date	Sample Time				湖湖				HUNK	THE SUIT	网络护护
1081	WATER	12.4.00	07001	4.00		`							
10B2	WATER	12.4.00	0945	X	X	_ X	X	<u> </u>	<u> </u>	<u> </u>	X	X	X
1083	WATER	12.4.0	1015	X	<u> </u>			<u> </u>	<u> </u>	_ 	<u> </u>	*	X
1265	WATER	12.4.00	0975	RY.					 		 	ļ	
1266	WATER	14-4-00		1240		لــــاـــا	<u> </u>		<u> </u>		<u> </u>		Matrix *
SAMPLES DID NOT ORIGINATE IN Received By Date/Time Date/Time Received By Date/Time Date/Time Received By Date/Time Received By Date/Time Received By Date/Time Received By Date/Time Received By Date/Time Date/Time 12/4/00 Date/Time Page Date/Time Date/Time Date/Time Date/Time Date/Time Date/Time Date/Time										S-Sail SE-Scdiment SD-Solid S-Shulge W - Water O-Oil A-Air DS-Druam Solids DL-Druam Liquids T-Tissue Wi-Wipe L-Liquid V-Vegetation X-Other			
BORATORY Received B SECTION	•		-			n:	sed By			<u> </u>	ŕ	Date/Time	
IAL SAMPLE Disposal M	lethod			•		Fusboi	y					rater t mat	<u></u>

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	А	В	(c)	D	E
PROJECT: E	RDF		DATA PACKAGE	: H)/-	73
VALIDATOR:	TCI	LAB: LUI	·	DATE: 3/5	101
CASE:			SDG:	H1173	
		ANALYSES	PERFORMED		
CLP Volatiles	SW-846 8240 (cap column)	SW-846 8260 (packed column)	CLP Semivolatiles	SW-846 8270 (cap column)	SW-846 (packed column)
	7 9015B	\$ 831s			
1. DATA PACK Is technical Is a case nar Comments: 2. HOLDING T Are sample ho Comments:	AGE COMPLETEN verification rative presen IMES Iding times a	documentation t?	NARRATIVE present? .	· · · · · · · · · · · · · · · · · · ·	res No N/A (es No N/A (es No N/A

GC/MS ORGANIC DATA VALIDATION CHECKLIST

3. INSTRUMENT TUNING AND CALIBRATION	C	
Is the GC/MS tuning/performance check acceptable? Ye	s No N	/A
Are initial calibrations acceptable? Ye		/A /
Are continuing calibrations acceptable? Ye		/ <i>P</i> /
Comments:		<u>/</u>
4. BLANKS		
Were laboratory blanks analyzed?	No N	I/A
Are laboratory blank results acceptable? Ye	/ / 1	I/A
Were field/trip blanks analyzed? Ye		I/A
Are field/trip blank results acceptable? Ye		B
Comments: Methylene Chibrido U		
acetare 3.8+U		
NOFIS	·	
Furm Diet 5000		
5. ACCURACY		
Were surrogates/System Monitoring Compounds analyzed?	es No I	N/A
Are surrogate/System Monitoring Compound recoveries acceptable? Y		N/A
Were MS/MSD samples analyzed?		N/A
	\frown	N/A
Comments: Surrogate - 11220 Al U - OK		
·		

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6.	PRECISION				\	
Are	MS/MSD RPD values acceptable?			Yes	No	N/A
Are	field duplicate RPD values acceptable?			(Tes)	No	N/A
	field split RPD values acceptable?	•		Yes	No	(N/A)
Com	nents:					
					****	·
					-	
	SYSTEM PERFORMANCE			,		
	e internal standards analyzed?				No	'WA
	internal standard areas acceptable?				No	MAK
	internal standard retention times acceptable?	•		Yes	No	(N/A)
Comn	ments:					
						
		,				
8.	COMPOUND IDENTIFICATION AND QUANTITATION					
	compound identification acceptable?			Vac	No	N/A
	compound quantitation acceptable?				No	N/a
	ments:	•	•	163	NO	(1/)
•						
						·
		-				
9.	REPORTED RESULTS AND QUANTITATION LIMITS					
Are	results reported for all requested analyses?			(Yes)	No	N/A
	all results supported in the raw data?			. Yes	No	(N/A
	esults meet the CRQLs?			. Yes	No	N/A
	the laboratory properly identified and coded all TIC?				No	N/A
	ents:					
				•		

Date:

15 March 2001

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project: ERDF Leachate Delisting Analysis

Subject: Wet Chemistry - Data Package No. H1173-RLN (SDG No. H1173)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. H1173-RLN prepared by Recra LabNet (RLN). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
B110B2	12/4/00	Water	С	See note 1
B110B3	12/4/00	Water	С	See note 1

^{1 -} IC Anions - 9056 (bromide, chloride, fluoride, nitrate, nitrite, phosphate, sulfate); ammonia -350.3; cyanide - 9010B; total organic carbon (TOC) - 9060; total dissolved solids (TDS) - 160.1; total suspended solids (TSS) - 160.2; specific conductance - 9050A, pH - 9040A; sulfide - 9030A; oil & grease - 9070.

Data validation was conducted in accordance with the BHI validation statement of work and the Environmental Restoration Disposal Facility, Hanford Site, 200 Areas -Amended Record of Decision, Decision Responsiveness Summary. Appendices 1 through 6 provide the following information as indicated below:

Appendix 1. Glossary of Data Reporting Qualifiers

Appendix 2. Summary of Data Qualification

Appendix 3. Qualified Data Summary and Annotated Laboratory Reports

Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation

Appendix 5. Data Validation Supporting Documentation

Appendix 6. Additional Documentation Requested by Client

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times are assessed to ascertain whether the holding time requirements have been met by the laboratory. The holding time requirements are as follows: 28 days for ammonia, specific conductance, TOC and oil &

grease; 14 days for cyanide; 7 days for sulfide, TSS and TDS; 2 days for IC anions; and immediate for pH.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Due to the holding time being exceeded by less than twice the limit, all IC anions were qualified as estimates and flagged "J".

Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J".

It should be noted that when the cyanide sample were received at the laboratory the pH indicated that the samples were either not preserved correctly or the sample matrix buffered the preservative. No qualifiers were assigned.

Holding times were met for all other parameters and samples.

Method Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. All blank results must fall below the contract required detection limit (CRQL) to be acceptable.

All method blank results were acceptable.

Field Blanks

No field blanks were submitted for analysis, therefore, no field blank data was available for review.

Accuracy

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample

concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of less than 30% and a sample value below the instrument detection limit (IDL) are rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 125% or less than 75% and a sample result greater than the IDL are qualified "J". Finally, for samples with a spike recovery greater than 125% and a sample result less than the IDL, no qualification is required.

All matrix spike recovery results were acceptable.

Precision

<u>Laboratory Duplicate Samples</u>

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within relative percent difference (RPD) limits of plus or minus 20% for water samples. If RPD values are out of specification and the sample concentration is greater than five times the project quantitation limit (PQL) or CRQL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the PQL/CRQL and the sample concentration is less than five times the PQL/CRQL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 20% for positive sample results greater than five times the PQL/CRQL or plus or minus the PQL/CRQL for positive sample results less than five times the PQL/CRQL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to an RPD of 23.1%, all total dissolved solids results were qualified as estimates and flagged "J".

All other laboratory duplicate results were within the required control limits.

Field Duplicate Samples

One pair of field duplicate samples (samples B110B2/B110B3) were submitted to Recra for analysis. The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for total organic carbon (30%) and total dissolved solids (29%) were outside QC limits. Under the BHI statement of work, no qualification is required. All other field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against the DOE Environmental Restoration Disposal Facility, Hanford Site, 200 Areas - Amended Record of Decision, Decision Responsiveness Summary project quantitation limits (PQLs) to ensure that laboratory detection levels meet the required criteria. The following reported detection limits were above the PQL: Cyanide, phosphate, nitrite, fluoride, bromide, ammonia and total suspended solids. Under the BHI statement of work, no qualification is required. All other reported laboratory detection levels met the analyte specific PQL.

Completeness

Data package No. H1173-RLN (SDG No. H1173) was submitted for validation and verified for completeness. Completeness is based on the percentage of data determined to be valid (i.e., not rejected). The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to the holding time being exceeded by less than twice the limit, all detected IC anions were qualified as estimates and flagged "J". Due to the holding time being exceeded by greater than twice the limit, all pH results were qualified as estimates and flagged "J". Due to an RPD of 23.1%, all total dissolved solids results were qualified as estimates and flagged "J". Data flagged "J" indicates that the associated concentration is an estimate, but under the BHI statement of work, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

The following reported detection limits were above the PQL: Cyanide, phosphate, nitrite, fluoride, bromide, ammonia and total suspended solids. Under the BHI statement of work, no qualification is required.

REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

Appendix 1

Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with WHC procedures are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2

Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: H1173	REVIEWER: TLI	DATE: 3/15/00	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
pH IC anions	J	All	Holding times
Total dissolved solids	J	All	RPD

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFO	RD.			ļ										•													
Laboratory: Recra LabNet																											
Case	SDG:									,								r		····		г					
Sample Number		B110B2	_	B110B3	_					ļ						<u> </u>						<u> </u>		├ ──			
Remarks				Duplicat				L		ļ		<u> </u>				ļ						ļ		<u> </u>			
Sample Date		12/04/0		12/04/0	0				_	ļ		ļ			_	<u> </u>			r_		T_	<u> </u>	Ι_	<u> </u>	T_	<u> </u>	
General Chemistry	CRDL	Result		Result		Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	<u> </u>
Bromide	0.25			12.5			∟	ļ	L	ļ	\vdash	ļ	<u> </u>		ļ	ļ			_	}	⊢	-	<u> </u>		—	 	—
Chloride	T	303	-	296	_	L	<u> </u>	L	<u> </u>	ļ	<u> </u>	ļ	_		▙		_		ļ	-		ļ <u>.</u>	⊢		 		+
Fluoride	0.05	5.0	UJ	5.0		ļ	<u> </u>		L	ļ	<u> </u>		<u> </u>		┕	ļ!			<u> </u>		<u> </u>	ļ	⊢		-		
Nitrite	0.05	12	UJ	12	_		<u> </u>		L	<u> </u>	匚	ļ		ļ	ļ	ļi	_		<u> </u>		▙	ļ	<u> </u>		III.	<u> </u>	—
Nitrate	0.05	260	J	290		ļ	匚			ļ	<u> </u>	ļ	╙	ļ	L						<u> </u>		▙		<u> </u>	—	
Cyanide***	3.1			5.0			$oldsymbol{oldsymbol{\sqcup}}$	<u> </u>		<u> </u>	<u> </u>	<u> </u>			\vdash				ļ		⊢	ļ	\vdash	<u> </u>	ļ	—	-
Phosphate	0.25	0.50	UJ	0.50			<u> </u>		L	<u> </u>	$oxed{oxed}$				Ļ		$oxed{oxed}$		<u> </u>		L		<u> </u>		⊢	<u> </u>	
Sulfate	0.25	369	J	384	_		匚		L	<u> </u>	L_	ļ	L_		_				ļ		<u> </u>		_		L		+
Ammonia	0.03	0.10	U	0.10	U	<u> </u>	L		L		_		<u> </u>		L		_		<u> </u>		_				┝	<u> </u>	+
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Oil & Grease	0.5	4.8		4.7	L_		乚	<u> </u>	_	<u> </u>	<u> </u>		$ldsymbol{ldsymbol{ldsymbol{eta}}}$		L				ļ		<u> </u>		_		⊢		—
pH*	0.1	7.8		7.8	L				<u> </u>	<u> </u>	L				L				<u> </u>		<u> </u>				⊢		+
Sulfide		1.0		1.0	υ				L	<u> </u>	L				┕	ļ			<u> </u>		<u> </u>	<u> </u>	 _		⊢		+-
Specific Conductance**	0.15	2360	<u> </u>	2430			L	L	┖	ļ	L.	<u> </u>			╙	<u> </u>			⊢		⊢	—			⊢		+-
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^{*} Units are pH units

^{**} Units are UMHOS/CM

^{***} Units are ug/l

INORGANICS DATA SUMMARY REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

					REPORTING	DILUTION
SAMPLE	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
	*********		******	*****	*********	63 m 7 m 4 2 2
-002	B110B2	Bromide by IC	12.5 u.J	MG/L	12.5	50.0
		Chloride by IC	303 1	MG/L	12.5	50.0
		Fluoride by IC	5.0 u	MG/L	5.0	10.0
		Nitrite by IC		SMG/L	12	50
		Nitrate by IC	260 Z	MG/L	12	50
		Cyanide, Total	5.0 u		5.0	1.0
	,	Phosphate by IC	0.50 uʻ		0.50	2.0
		Sulfate by IC	369	MG/L	12.5	50.0
		Ammonia, as N	0.10 u	MG/L	0.10	1.0
		Total Organic Carbon	10.8	MG/L	0.50	1.0
		Oil & Grease Gravimetri	4.8	MG/L	1.1	1.0
		рн .	7.8 J	PH UNIT		1.0
		sulfide	1.0	MG/L	1.0	1.0
		Specific Conductance	2360	_UMHOS/C		1.0
		Total Dissolved Solids		MG/L	5.0	1.0
		Total Suspended Solids	5.0 u	MG/L	5.0	1.0
-003	B110B3	Bromide by IC	12.5 u	JMG/L	12.5	50.0
		Chloride by IC	296	J mg/l	12.5	50.0
		Pluoride by IC	5.0 u	Jmg/L	5.0	10.0
		Nitrite by IC		JMG/L	12	50
		Nitrate by IC	290	J mg/l	12	50
		Cyanide, Total	5.0 u	UG/L	5.0	1.0
	•	Phosphate by IC	0.50 น	J mg/l	0.50	2.0
		Sulfate by IC	384	J MG/L	12.5	50.0
		Ammonia, as N	0.10 0	MG/L	0.10	1.0
		Total Organic Carbon	8.0	MG/L	0.50	1.0
		Oil & Grease Gravimetri	4.7	MG/L	1.1	1.0
		рH	7.8 J	PH UNI	T 0.01	1.0
	•	Sulfide	1.0	MG/L	1.0	1.0
		Specific Conductance	2430	UMHOS/	C 1.0	1.0
		Total Dissolved Solids	2000	MG/L	5.0	1.0
		Total Suspended Solids	5.0	u MG/L	5.0	1.0

3/17/01

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Chemical and Environmental Measurement Information

Recra LabNet Philadelphia Analytical Report

Client: TNU-HANFORD B99-037 H1173

W.O. #: 10985-001-001-9999-00

RFW#: 0012L502

Date Received: 12-07-00

INORGANIC CASE NARRATIVE

1. This narrative covers the analyses of 2 water samples.

- 2. The samples were prepared and analyzed in accordance with the methods checked on the attached glossary.
- 3. Sample holding times as required by the method and/or contract were met with the exception of Nitrate, Nitrite, Phosphate and pH which were received past hold and replicate and spike analyses for Ammonia sample B110B3.
- 4. The cooler temperatures were recorded on the chain-of-custody.
- The method blanks were within method criteria with the exception of 00LSS190-MB1 for Total Dissolved Solids (TDS) which was above the reporting limit and 00LSS191-MB1 for Total Suspended Solids (TSS) which was at the reporting limit. Results for TDS were greater than 10 times the reporting limit and TSS results were less than the reporting limit.
- 6. The Laboratory Control Samples (LCS) were within the laboratory control limits. The duplicate LCS were within the 20% Relative Percent Difference (RPD) control limit.
- 7. The matrix spike recoveries were within the 75-125% control limits.
- 8. The replicate analyses were within the 20% RPD control limit with the exception of TDS.
- 9. For Total Cyanide analysis, the sample was found to be neutral, though the bottle indicated sodium hydroxide (NaOH) preservative which would have fixed it to pH > 12. The sample matrix may have buffered the NaOH preservative.
- 10. I certify that this sample data package is in compliance with SOW requirements, both technically and for completeness, other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

J. Michael Taylor

VP, Laboratory General Manager

Lionville Laboratory

nip&per\(\text{i12-502}\)
The results presented in this report relate only to the analytical testing and conditions of the samples at receipt and during storage. All pages of this report are integral parts of the analytical data. Therefore, this report should only be reproduced in its entirety of 19 pages.

0000013

JAn.

01-24-01 Data

Recra LabNet Philadelphia Sample Discrepancy Report (SDR) SDR #: 000007869
Initiator:Batch:Batch:Parameter:
Date: 12-660 Samples: 02-00-5 Matrix: CN 2
Client: TNU Method: SW846/MCAWW/CLP/ Prep Batch:
1. Reason for SDR a. COC Discrepancy Tech Profile Error Client Request Sampler Error on C-O-C Transcription Error Wrong Test Code Other
b. General Discrepancy Missing Sample/ExtractContainer BrokenWrong Sample PulledLabel ID's IllegibleHold Time ExceededInsufficient SamplePreservation WrongReceived Past HoldImproper Bottle TypeNot Amenable to Analysis Note: Verified by [Log-In] or [Prep Group] (circle)signature/date:
c. QC Problem (Include all relevant specific results; attach data if necessary)
Neitral
ylea
2. Known or Probable Causes(s)
2. Known or Probable Causes(s) Aan ple matry may have buffered preserved 3. Discussion and Proposed Action Other Description:
San ple matrix may have buffered preservation
3. Discussion and Proposed Action Re-log Entire Batch Following Samples: Re-leach Re-extract Re-digest Other Description: Prepase to Marrate. Prepase to Marrate.
Revise EDD Change Test Code to Place On/Take Off Hold (circle)
4. Project Manager Instructionssignature/date:
Concur with Proposed Action Disagree with Proposed Action; See Instruction Include in Case Narrative Client Contacted: Date/Person
Add Cancel
5. Final Actionsignature/date: // Leading /-23-0/ Other Explanation: Verified re-[log][leach][extract][digest][analysis] (circle) X Included in Case Narrative Hard Copy COC Revised Electronic COC Revised EDD Corrections Completed
When Final Action has been recorded, forward original to QA Specialist for distribution and filing.
Route Distribution of Completed SDR X Initiator Note

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AL SAMPLE Disposal N	Method			<u> </u>	Dispo	sed By					D	ate/Time		

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SAMPLE ANALYSIS							Sulfides - 9030	17	400	Secution Speci Instruct	al	Total Cyanide - 9010	90	Br-14	See item (2) in Special Instructions	Chloro- Herbicides - EPABISI	Pest/PCBs - \$081	See item (3) in Special Instructions
Sample No.	Matrix *	Sample D	ate	Sample Time		<u>.</u> .`}			+	1	7: ¥-					-		
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AL SAMPLE Disposal Me SPOSITION	ethod								Dispos	ed By						Di	nte/Time	

Appendix 5

Data Validation Supporting Documentation

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	В	С	D	E
PROJECT:	FRDF		DATA PACKAGE	: #1173	,
VALIDATOR:	741	LAB: Rec		DATE: 3/9/	01
CASE:			SDG: H1	173	
ONDE.		ANAL YSES	PERFORMED		
Anions/IC	Тос	п тох	☐ TPH-418.1	Olland Greene	Alkalinity
Ammonia	BOD/COD	☐ Chloride	☐ Chromium-VI	DX pH	□ NO-NO,
€ Sulfate	₹ TDS	□ TKN	☐ Phosphate	X755	
& rulficle	& speccal	0	0		
SAMPLES/MAT	<u></u>				
SAMPLES/MAI		2 Bil	083		
	1011013	2 4011	<u> </u>		
		,			ata
				<u> </u>	ala
Is technica	CKAGE COMPLETE l verification arrative prese	documentati	on present?		Yes No N/A Yes No N/A
Comments:					
					
2. HOLDING	holding times	,			Yes No N/A
Comments:	pt	ions	f days		
- CN ,	preservetien	- undete	٥٠ - كما	90-1	
					

A-25'7 000019

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

3. INSTRUMENT CALIBRATION	
Was initial calibration performed for all applicable analyses? Yes	No VN/A
Are initial calibration results acceptable? Yes	No N/A
Was a calibration check performed for all applicable analyses? Yes	No N/A
Are calibration check results acceptable? Yes	No N/A
\cdot	
Comments:	
4. BLANKS	
Were laboratory blanks analyzed?) NO N/A
Are laboratory blank results acceptable?	No N/A
Were field/trip blanks analyzed? Yes	NO N/A
Are field/trip blank results acceptable? Yes	No N/A
Comments: NOFB	
5. ACCURACY	-
Were spike samples analyzed at the required frequency? Yes	No N/A
Are spike recoveries acceptable? Yes	No NZA
Were LCS analyses performed at the required frequency? Yes	No NA
Are LCS recoveries acceptable? Yes	No (N/A
Comments:	
Comments	
6. PRECISION	
Were laboratory duplicate samples analyzed	
at the required frequency?	S No N/
Are laboratory duplicate sample RPD values acceptable? Ye	> *
Are field duplicate RPD values acceptable? Ye	The second second
Are field split RPD values acceptable? Ye	s No (N/

GENERAL CHEMISTRY DATA VALIDATION CHECKLIST

Comments:	FP	Tociso	nto ts	5 (29	た。 <u>)</u>			
7. ANALYTE Q Was analyte q Comments:					• • •	Yes	No	N/A
			,					
8. REPORTED Are results of Are results of Do results me	supported in calculated pr	all request the raw dat roperly? .	ted analyses		• • • •	Yes Yes	No No No	N/A N/A N/A
Comments:				nema	A			

0000C1

Appendix 6

Additional Documentation Requested by Client

INORGANICS PRECISION REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173

RECRA LOT #: 0012L502

MOKK	OKDEK:	10985-001-001-9999-0	3

			INITIAL			DILUTION
Sample	SITE ID	ANALYTE	result	REPLICATE	RPD	Factor (REP)
222222			******			*****
-002RBP	B110B2	Bromide by IC	12.5 u	12.5 u	NC	50.0
		Chloride by IC	303	301	0.62	50.0
		Fluoride by IC	5.0 u	5.0 u	NC	10.0
		Nitrite by IC	12 u	12 u	ИС	50
		Nitrate by IC	260	260	0.68	50
		Phosphate by IC	0.50u	0.50u	ИC	2.0
		Sulfate by IC	369	369	0.097	50.0
		Total Organic Carbon	10.8	10.1	6.6	1.0
		Total Dissolved Solids	1500	1900	23.1	1.0
		Total Suspended Solids	5.0 u	5.0 u	NC	1.0
-003REP	B110B3	Cyanide, Total	5.0 u	5.0 u	NC	1.0
		Ammonia, as N	0.10u	0.10u	NC	1.0
		Oil & Grease Gravimetri	4.7	4.5	4.5	1.0
		рH	7.8	7.9	1.9	1.0
		Sulfide	1.0 u	2.0 u	NC	1.0

INORGANICS DUPLICATE SPIKE REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173

RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

			SPIKE#3	2	
Sample	SITE ID	ANALYTE	*RECOV	*RECOV	*DIFF
****		******			
BLANK10	00LICD78-MB1	Browide by IC	97.8	97.8	0.061
		Chloride by IC	99.2	94.2	5.1
		Fluoride by IC	107.4	101.7	5.4
		Nitrite by IC	98.2	98.7	0.47
		Nitrate by IC	97.1	97.2	0.062
		Phosphate by IC	100.6	102.4	1.7
		Sulfate by IC	96.1	95.7	0.40
BLANK10	00LAM058-MB1	Ammonia, as N	109.0	103.5	5.2
BLANK10	00LOG039-MB1	Oil & Grease - Grav	101.6	96.6	5.1
BLANK10	00LSD057-MB1	Sulfide	100.4	98.8	1.6
BLANK10	00LSP043-MB1	Specific Conductance	99.4	100.2	0.74
BLANK10	00LSS190-MB1	Total Dissolved Solids	100	112.0	11.3

INORGANICS ACCURACY REPORT 01/23/01

CLIENT: TNUHANFORD B99-037 H1173

RECRA LOT #: 0012L502

WORK ORDER: 10985-001-001-9999-00

				SLIKED	INTITAL	SLIVED		DIRGITON
SAM	PLE	SITE ID	ANALYTE	Sample	result	AMOUNT	*RECOV	factor (SPK)
====				******				********
BLA	NK10	01LAMB03-MB1	Ammonia, as N	2.1	0.10u	2.0	105.5	1.0

INORGANICS ACCURACY REPORT 01/23/01

CLIENT: TNUHANFORD 899-037 H1173 WORK ORDER: 10985-001-001-9999-00 RECRA LOT #: 0012L502

WORK ORDER: 10965-001-001-9999-00			SPIKED	INITIAL	SPIKED		DILUTION	
SAMPLE	SITE ID	ANALYTE	SAMPLE	RESULT	AMOUNT	*RECOV	FACTOR (SPK)	
				*****	****			
-002	B110B2	Bromide by IC	477	0.00	500	95.4	100	
		Chloride by IC	772	303	500	93.7	100	
		Fluoride by IC	102	0.40	100	101.9	10.0	
		Nitrite by IC	500	12 u	500	100.2	100	
		Nitrate by IC	760	260	500	99.1	100	
		Cyanide, Total	52	5.0 u	50	103.8	1.0	
		Phosphate by IC	9.0	0.50u	10.0	89.5	2.0	
		Sulfate by IC	878	369	500	101.9	100	
		Total Organic Carbon	15.1	10.8	5.0	86.4	1.0	
-003	B110B3	Ammonia, as N	1.8	0.10u	2.0	90.0	1.0	
		Sulfide	26.0	0.00	26.7	97.4	1.0	
BLANK10	OOLICO78-MB1	Browide by IC	4.9	0.25u	5.0	97.8	1.0	
		Bromide by IC MSD	4.9	0.25u	5.0	97.8	1.0	
		Chloride by IC	5.0	0.25u	5.0	99.2	1.0	
		Chloride by IC MSD	4.7	0.25u	5.0	94.2	1.0	
		Fluoride by IC	10.7	0.50u	10.0	107.4	1.0	
		Fluoride by IC MSD	10.2	0.501	10.0		1.0	
		Nitrite by IC	4.9	0.25u	5.0		1.0	
•		Nitrite by IC MSD	4.9	0.25u	5.0		1.0	
		Nitrate by IC	4.9	0.25u			1.0	
		Nitrate by IC MSD	4.9	0.25u			1.0	
		Phosphate by IC	5.0	0.25u			1.0	
		Phosphate by IC MSD	5.1	0.25u			1.0	
		Sulfate by IC	4.8	0.25u			1.0	
		Sulfate by IC MSD	4.8	0.25u			1.0	
BLANK10	00LAM058-MB1	Ammonia, as N	1.1	0.10u			1.0	
		Ammonia, as N MSD	2.1	0.10u			1.0	
BLANK10	00LTC039-MB1	Total Organic Carbon	5.3	0.50u			1.0	
BLANK10	00LOG039-MB1	Oil & Grease Gravimetr	50.9	1.0 u	•		1.0	
		Oil & Grease - Grav M	39.5	1.0 u			1.0	
BLANK10	OOLSDOS7-MB1	Sulfide	13.4	1.0 U			1.0	
•		Sulfide MSD	12.0	1.0 0			1.0 1.0	
BLANK10	00LSP043-MB1	Specific Conductance	146	1.0 1		99.4	1.0	
		Spec Conductance MSD	718	1.0 t		100.2	1.0	
BLANK10	00LSS190-MB1	Total Dissolved Solids	100	0.00	100	100	1.0	
		Total Dissolved Solids	110	0.00	100	112.0	1.0	
BLANK10	00LSS191-MB1	Total Suspended Solids	110	0.00	100	106.0	1.0	

INORGANICS METHOD BLANK DATA SUMMARY PAGE 01/23/01

CLIENT: TNUHANFORD 899-037 H1173 WORK ORDER: 10985-001-001-9999-00

RECRA LOT #: 0012L502

					reporting	DILUTION
sample	SITE ID	ANALYTE	RESULT	UNITS	LIMIT	FACTOR
345444	非等消除特殊发展的需要需要		****	*****	对苯甲甲甲酰苯甲基基	54555353
BLANK10	00LICO78-MB1	Browide by IC	0.25 u	MG/L	0.25	1.0
		Chloride by IC	0.25 u	MG/L	0.25	1.0
		Fluoride by IC	0.50 u	MG/L	0.50	1.0
		Nitrite by IC	0.25 u	MG/L	0.25	1.0
		Nitrate by IC	0.25 u	MG/L	0.25	1.0
		Phosphate by IC	0.25 u	MG/L	0.25	1.0
		Sulfate by IC	0.25 u	MG/L	0.25	1.0
BLANKI	00LC126-MB1	Cyanide, Total	5.0 u	UG/L	5.0	1.0
BLANK10	00LAM058-MB1	Ammonia, as N	0.10 u	MG/L	0.10	1.0
BLANK10	00LTC039-MB1	Total Organic Carbon	0.50 u	MG/L	0.50	1.0
BLANK10	00LOG039-MB1	Oil & Grease Gravimetri	1.0 u	MG/L	1.0	1.0
BLANK10	00LSD057-MB1	Sulfide	1.0 u	MG/L	. 1.0	1.0
BLANK10	OCLSPO43-MB1	Specific Conductance	1.0 u	UMHOS/C	1.0	1.0
BLANK10	00LSS190-MB1	Total Dissolved Solids	7.0	MG/L	5.0	1.0
BLANKIO	00LSS191-MB1	Total Suspended Solids	5.0	MG/L	\$.0	1.0
BLANK10	01LAMB03-MB1	Ammonia, as N	0.10 u	MG/L	0.10	1.0

Recra LabNet - Lionville Laboratory INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD B99-037 H1173

DATE RECEIVED: 12/07/00 RFW LOT # :0012L502

CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
						
B110B2						
BROMIDE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
BROMIDE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
BROMIDE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
CHLORIDE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
CHLORIDE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
CHLORIDE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
FLUORIDE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
FLUORIDE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
FLUORIDE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRITE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRITE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRITE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRATE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRATE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
NITRATE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
TOTAL CYANIDE	002	W	00LC126	12/04/00	12/14/00	12/14/00
TOTAL CYANIDE	002 MS	W	00LC126	12/04/00	12/14/00	12/14/00
PHOSPHATE BY IC	002	W	00LIC078	12/04/00	12/08/00	12/08/00
PHOSPHATE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
PHOSPHATE BY IC	002 MS	W	00LIC078	12/04/00	12/08/00	12/08/00
SULFATE BY IC	002	W	00LIC078		12/08/00	12/08/00
SULFATE BY IC	002 REP	W	00LIC078	12/04/00	12/08/00	12/08/00
SULFATE BY IC	002 MS	W	00LIC078		12/08/00	12/08/00
AMMONIA	002	W	00LAM058	12/04/00	12/29/00	12/29/00
TOTAL ORGANIC CARBON	002	W	00LTC039	12/04/00	12/27/00	12/27/00
TOTAL ORGANIC CARBON	002 REP	W	00LTC039	12/04/00	12/27/00	12/27/00
TOTAL ORGANIC CARBON	002 MS	W	00LTC039	12/04/00	12/27/00	12/27/00
OIL & GREASE BY GRAV	002	W	00LOG039	12/04/00	12/16/00	12/17/00
PH	002	W	00LPH100		12/08/00	12/08/00
SULFIDE	002	W	00LSD057	12/04/00	12/08/00	12/08/00
SPECIFIC CONDUCTANCE	002	W	00LSP043	12/04/00	12/11/00	12/11/00
TOTAL DISSOLVED SOLI	002	W	00LSS190	12/04/00	12/08/00	12/11/00
TOTAL DISSOLVED SOLI	002 REP	W	00LSS190		12/08/00	12/11/00
TOTAL SUSPENDED SOLI	002	W	00LSS191	•	12/11/00	12/11/00
TOTAL SUSPENDED SOLI	002 REP	W	00LSS191	12/04/00	12/11/00	12/11/00



Recra LabNet - Lionville Laboratory INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD B99-037 H1173

DATE RECEIVED: 12/07/00				012L502		
CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
B110B3						-
BROMIDE BY IC CHLORIDE BY IC FLUORIDE BY IC NITRITE BY IC NITRATE BY IC TOTAL CYANIDE TOTAL CYANIDE PHOSPHATE BY IC SULFATE BY IC AMMONIA AMMONIA TOTAL ORGANIC CARBON OIL & GREASE BY GRAV OIL AND GREASE BY GR PH PH SULFIDE SULFIDE SULFIDE SPECIFIC CONDUCTANCE TOTAL DISSOLVED SOLI	003 003 003 003 003 003 003 003 003 003	W W W W W W W W W W W	00LIC078 00LIC078 00LIC078 00LIC078 00LIC078 00LC126 00LC126 00LIC078 00LIC078 00LAM058 01LAMB03 01LAMB03 00LTC039 00LOG039 00LOG039 00LOG039 00LOG039 00LPH100 01LPH004 00LSD057 00LSD057 00LSD057	12/04/00 12/04/00	12/08/00 12/08/00 12/08/00 12/08/00 12/14/00 12/14/00 12/14/00 12/08/00 12/29/00 01/17/01 01/17/01 12/27/00 12/16/00 12/16/00 12/16/00 12/08/00 01/15/01 12/08/00 12/08/00 12/08/00 12/08/00 12/11/00 12/08/00	12/08/00 12/08/00 12/08/00 12/08/00 12/08/00 12/14/00 12/14/00 12/14/00 12/08/00 12/29/00 01/18/01 01/18/01 12/27/00 12/17/00 12/17/00 12/17/00 12/17/00 12/08/00 01/15/01 12/08/00 12/08/00 12/08/00 12/11/00 12/11/00
TOTAL SUSPENDED SOLI	003	W	00LSS191	12/04/00	12/11/00	12/11/00
BROMIDE BY IC BROMIDE BY IC BROMIDE BY IC CHLORIDE BY IC CHLORIDE BY IC CHLORIDE BY IC FLUORIDE BY IC FLUORIDE BY IC FLUORIDE BY IC	MB1 BS MB1 BSD MB1 BSD MB1 BSD MB1 BSD MB1 BSD MB1 BSD MB1 BSD	W W W W W W	00LIC078 00LIC078 00LIC078 00LIC078 00LIC078 00LIC078 00LIC078	N/A N/A N/A	12/08/00 12/08/00 12/08/00 12/08/00 12/08/00 12/08/00 12/08/00 12/08/00	12/08/00 12/08/00 12/08/00 12/08/00 12/08/00 12/08/00 12/08/00 12/08/00

Recra LabNet - Lionville Laboratory INORGANIC ANALYTICAL DATA PACKAGE FOR TNUHANFORD B99-037 H1173

DATE RECEIVED: 12/07/00

RFW LOT # :0012L502

				•		
CLIENT ID /ANALYSIS	RFW #	MTX	PREP #	COLLECTION	EXTR/PREP	ANALYSIS
NITRITE BY IC	MB1	w	00LIC078	N/A	12/08/00	12/08/00
NITRITE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
NITRITE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
NITRATE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
NITRATE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
NITRATE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
TOTAL CYANIDE	LCS L	W	00LC126	N/A	12/14/00	12/14/00
TOTAL CYANIDE	LCS L	W	00LC126	N/A	12/14/00	12/14/00
TOTAL CYANIDE	MB1	W	00LC126	N/A	12/14/00	12/14/00
PHOSPHATE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
PHOSPHATE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
PHOSPHATE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
SULFATE BY IC	MB1	W	00LIC078	N/A	12/08/00	12/08/00
SULFATE BY IC	MB1 BS	W	00LIC078	N/A	12/08/00	12/08/00
SULFATE BY IC	MB1 BSD	W	00LIC078	N/A	12/08/00	12/08/00
AMMONIA	MB1	W	00LAM058	N/A	12/29/00	12/29/00
AMMONIA	MB1 BS	W	00LAM058	N/A	12/29/00	12/29/00
AMMONIA	MB1 BSD	W	00LAM058	N/A	12/29/00	12/29/00
TOTAL ORGANIC CARBON	MB1	W	00LTC039	N/A	12/27/00	12/27/00
TOTAL ORGANIC CARBON	MB1 BS	W	00LTC039	N/A	12/27/00	12/27/00
OIL & GREASE BY GRAV	MB1	W	00LOG039	N/A	12/16/00	12/17/00
OIL AND GREASE BY GR	MB1 BS	W	00LOG039	N/A	12/16/00	12/17/00
OIL AND GREASE BY GR	MB1 BSD	W	00LOG039	N/A	12/16/00	12/17/00
SULFIDE	MB1	W	00LSD057	N/A	12/08/00	12/08/00
SULFIDE	MB1 BS	W	00LSD057	N/A	12/08/00	12/08/00
SULFIDE	MB1 BSD	W	00LSD057	N/A	12/08/00	12/08/00
SPECIFIC CONDUCTANCE	MB1	W	00LSP043	N/A	12/11/00	12/11/00
SPECIFIC CONDUCTANCE	MB1 BS	W	00LSP043	N/A	12/11/00	12/11/00
SPECIFIC CONDUCTANCE	MB1 BSD	W	00LSP043	N/A	12/11/00	12/11/00
TOTAL DISSOLVED SOLI	MB1	W	00LSS190	N/A	12/08/00	12/11/00
TOTAL DISSOLVED SOLI	MB1 BS	W	00LSS190	N/A	12/08/00	12/11/00
TOTAL DISSOLVED SOLI	MB1 BSD	W	00LSS190	·	12/08/00	12/11/00
TOTAL SUSPENDED SOLI	MB1	W	00LSS191	N/A	12/11/00	12/11/00
TOTAL SUSPENDED SOLI	MB1 BS	W	00LSS191		12/11/00	12/11/00
AMMONIA	MB1	W	01LAMB03	_	01/17/01	01/18/01
AMMONIA	MB1 BS	M	01LAMB03	N/A	01/17/01	01/18/01

Duncan, Jeanette M

To: Subject: bchristian@techlawinc.com ERDF Comment Disposition

Bruce,

Received your comment disposition for H1173 (ERDF). Rich has reviewed this and says that you didn't disposition the following comments:

Rich's comment for page 10 of the Wet Chemistry: No J qualifier applied to TDS of TSS. Should be applied to TDS values.

Claude's comment #3 for Volatiles: Page 004, Field Duplicate samples refers to the sample numbers as B103K7/B103K8. The samples should be B110B2 & B110B3.

Could you fix and send me appropriate pages?

Thanks,

Jeanette

P.1%

2

S&D MANAGEMENT

	Review Comment Record (RCR)	1. Date 03/20/01	2. Review No. QA01-005	
		3. Project	4. Page	
		ERDF Leachate	Page 2 of 1	
12. 13. Com	ment(s)/Discrepancy(s) (Provide technical justification for the comment			

			03/20/01	QA01-005	
			3. Project ERDF Leachate	4. Page Page 2 of 1	
I2. (tem	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justifica	16. Status	
9	RadChem: Page 1 Sample ID for samples B110B2 and B110B3 is wrong, and Page 3 under Field Duplicate Samples same thing. Also for sample B11266 in the Analysis column should only have note 2.		Carrie K		
10					
ΙĮ					
		•			1

FAX

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 25 March 2001

Information Request #1

H1173

Claudes RCR comments:

#2 - volatiles. I'm going to need the lab to confirm which analysis it ran 8260A or 8260B?

#4 - volatiles. My pages 11 an 12 have numbers and I don't see anything in Claudes comments that would indicate they need a revision.



TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 25 March 2001

Information Request #1

H1173

Claudes RCR comments:

#2 - volatiles. I'm going to need the lab to confirm which analysis it ran. 8260A or 8260B?

#4 - volatiles. My pages 11 an 12 have numbers and I don't see anything in Claudes comments that would indicate they need a revision.

Review Comment Record (RCR)						1. Date 03/20/01		2. Review No. QA01-005	
					F	3. Project ERDF Leachate	4	Page 1 of 1	
5. Doc	ument Number(s)/Title(s)	6. Program/Project/ Building Number	7. Reviewer			8. Organization/Group		9. Location/Phone	
SDG No. H1173		ERDF Leachate Delisting Analysis	Claude Stacey			BHI/QA		H0-16/372-9208	
7. Comment Submittal Approval:		10. Agreement with indicated comment disposition(s)			11. CLOSED				
Orga	anization Manager (Optional)	Date Rev	iewer/Point o	f Contact		Date	Rev	iewer/Point of Contac	et
		Aut	hor/Originato				Aut	hor/Originator	
12. Item and detailed recommendation of the action required to discrepancy/problem indicated.)		e technical justification for the con required to correct/ resolve the	al justification for the comment 14. ed to correct/ resolve the Hold Point		15. Dispo	sition (Provide justific	ation if NOT	accepted.)	16. Status
1	Semivolatiles: OK.								
2	Volatiles: Page 001, Note 1 indicates whereas, the laboratory narrative indi 8260A. This may be an error in the la ERDF sample indicated they were usi	cates the analysis was ran by aboratory narrative since the	EPA						
3	Volatiles: Page 004, Field Duplicate numbers as B103K7/B103K8. Should	Samples refers to the sample d be B110B2/B110B3.			,				
4	Volatiles: The revised pages 011 and	012 need numbered.	B.12/12/2						
5	Wet Chemistry: Page 010, samples a The samples should be B110B2 and	re identified as B110B1 and I B110B3.	B110B2.						
6	Wet Chemistry: The report needs to indicate proper preservation when received sample bottles indicated NAOH a >12 when received at the laboratory t in the report. Especially since the res	eived at the laboratory. Ever dded the samples were not at here needs to be reference to	n though a pH of this fact						
7	PCBs, Pesticides, Herbicides: Page 3 samples as B110B3/B110B3. This sh	, Field Duplicate Samples ha							
8	Inorganic: OK								<u> </u>

Review Comment Record (RCR)	1. Date 03/20/01	2. Review No. QA01-005
	3. Project ERDF Leachate	4. Page Page 2 of 1

12. Item	13. Comment(s)/Discrepancy(s) (Provide technical justification for the comment and detailed recommendation of the action required to correct/ resolve the discrepancy/problem indicated.)	14. Hold Point	15. Disposition (Provide justification if NOT accepted.)	16. Status
9	RadChem: Page 1 Sample ID for samples B110B2 and B110B3 is wrong, and Page 3 under Field Duplicate Samples same thing. Also for sample B11266 in the Analysis column should only have note 2.			
10				
11				

Duncan, Jeanette M

From:

Weiss, Richard L

Sent:

To:

Subject:

Tuesday, March 20, 2001 12:59 PM Duncan, Jeanette M review of Validation Package for SDG H1173

Jeanette,

Comments on the validation package are as follows:

Wet Chemistry: pg 8 & 11; shows "J" qualification of total suspended solids. From the validation narrative, this should be for total dissolved solids (note total suspended solids were non-detect, no RPD could be calculated).

pg 10: No "J" qualifier applied to either TDS or TSS. Should be applied to TDS values.

All other sections - No Comment

Let me know if you have any questions.

Rich

Duncan, Jeanette M

From:

Weiss, Richard L

Sent: To:

Subject:

Tuesday, March 20, 2001 12:59 PM Duncan, Jeanette M review of Validation Package for SDG H1173

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All other sections - No Comment

Let me know if you have any questions.

Rich

No Company